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## CORONARY ARTERIOSCLEROSIS IN DIABETES MELLITUS\*

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**T**HERE are approximately 500,000 living diabetics in the United States at the present time, of whom more than one half are destined to die of some form of occlusive vascular disease. While the mortality resulting from gangrene of the feet has fallen, the mortality from gangrene of the heart has risen steadily during the past few years.

The significance of arteriosclerotic (coronary) heart disease in diabetes mellitus has not been fully appreciated. During a study of the clinical and pathologic aspects of arteriosclerotic heart disease in diabetes a complete study was made of a series of 175 diabetic patients with postmortem examinations made at the New England Deaconess Hospital during the period from 1921 to 1933.

The clinical records of each case were complete and covered periods of many years. The pathologic reports were made by Dr. Shields Warren. Careful dissections had been made of the coronary vessels. Many microscopic sections of the heart and coronary vessels were studied, utilizing a variety of tissue staining methods. A comparable series of nondiabetic patients of the same age group who had come to autopsy, was utilized for comparison of pathologic findings.

### CASES

The series was composed of 93 patients who had presented clinical evidences of hypertension and 82 patients who did not have hypertension. Those patients who had exhibited systolic blood pressures of 150 milligrams of mercury or more were included in the hypertensive group. Some cases were included in which the systolic blood pressure was not persistently above 150 milligrams of mercury. Since many of these patients had been subjected to surgical operations for gangrene of the extremities or other surgical complications of diabetes, variations in blood pressure were commonly encountered because of the shock attendant upon such operative procedures. On the other hand there were some patients in the nonhypertensive group

who presented evidences of cardiac failure and other conditions which, when they were observed for the first time may have masked a previously existing hypertension.

**Sex.** In this series were 100 women and 75 men. The hypertensive group comprised 58 women and 35 men while in the nonhypertensive group there were 42 women and 40 men. In the last series of 83 diabetic patients who had come to autopsy between 1929 and 1930, this same relationship of females to males obtained. In the nonhypertensive group the sex distribution was about equal. It is worthy of comment that in the hypertensive group the females greatly outnumbered the males.

**Age.** The average age at time of death for the patients of the hypertensive group was 62.4 years, for the nonhypertensive group the average age was 54.4 years. A number of relatively youthful patients in the nonhypertensive group appreciably lowered the average age. Possible confusion in evaluating this factor was avoided by also comparing the extent of coronary disease in each group of patients above 40 years of age. The average duration of diabetes in the hypertensive group was 7.9 years; in the nonhypertensive group it was 6.0 years. In the complete series of autopsied patients there were 46 persons whose diabetes had been present for 10 years or more. Twenty-four of these patients were women and 22 were men. The youngest person in the group of those who had had diabetes for 10 years or more was 43 years of age, with diabetes for 15.1 years, while the oldest was 83 years of age, with diabetes of 33.7 years' duration.

**Obesity.** Obesity was a common finding in both groups. Obesity was present in 87.2 per cent of the patients in the hypertensive group and in 74.7 per cent of those in the nonhypertensive group. The degree of obesity ranged as high as 90 per cent overweight.

**Incidental Factors.** Possible predisposing factors such as race, occupation, infection, heredity and endocrine dysfunction were considered, but none appeared to play any dominant rôle in this series. Rheumatic heart disease was present in 6 patients (Case Nos. 11,257, 11,692, 10,192, 6,380, 6,572, 5,983). Nine patients had positive serologic evidence of syphilis, but

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none showed any evidence of syphilitic heart disease at autopsy. One patient had persistent auricular fibrillation, secondary to hyperthyroidism. The pathologic changes found in the hearts at time of autopsy were predominantly due to arteriosclerosis.

**Control Series** The control series comprised a total of 170 consecutive autopsied nondiabetic patients, all of whom were over 40 years of age and who died during 1929 and 1930. The average age at time of death was 64 years. There were 87 females and 83 males. The changes in the coronary vessels were graded "0" to "4", depending upon the extent of the arteriosclerotic changes found. "Zero" denoted no atheromatous changes, while "4" indicated extreme coronary atherosclerosis with obliteration of the lumen, calcification and thrombosis.

**Data** Table 1 shows the distribution of cor-

In the control series of 170 nondiabetic patients, severe coronary disease was present in only 13 per cent, despite the fact that no patients under 40 years of age were included in this group and despite the fact that the average age at time of death was 61.9 years. Coronary thrombosis was present in only 4 cases (2 per cent).

Coronary heart disease was a cause of death in 36 patients (39 per cent) in the hypertensive group. All but one of these patients died primarily as a result of insufficiency of the coronary circulation, secondary to obliterative changes in the coronary arteries. This is in direct contrast to the higher incidence of myocardial insufficiency found in nondiabetic patients with hypertension. In the entire diabetic series only one patient (Case No. 4304) died as a result of myocardial insufficiency, secondary to hypertension, without advanced oblit-

TABLE 1  
CORONARY ARTERIOSCLEROSIS IN 175 DIABETICS AT AUTOPSY

93 Cases with Hypertension						82 Cases without Hypertension					
Cases	Grade of Sclerosis					Cases	Grade of Sclerosis				
	0	1	2	3	4		0	1	2	3	4
Number	7	15	15	31	25	Number	36	13	15	11	7
Per cent	8	16	16	33	27	Per cent	44	16	18	13	9
Age	61.1	57.6	65.7	65.9	61.7	Age	42.9	56.8	58.0	59.4	54.7
Duration D. M.	3.2	6.9	6.8	11.3	11.6	Duration D. M.	3.5	3.7	7.5	7.2	8.1
Heart weight	360.0	419.0	450.0	393.0	412.0	Heart weight	294.0	335.4	286.0	396.0	376.0

*Non Diabetic Control Series*

Cases	Grade of Sclerosis				
	0	1	2	3	4
Number	62	48	37	19	4
Per cent	37	28	22	11	2
Age	57.7	63.9	56.4	68.5	64.8
Heart weight	297	290	353	369	452

*Key to Table*

- 0 No Coronary Sclerosis
  - 1 Slight Coronary Sclerosis
  - 2 Moderate Coronary Sclerosis
  - 3 Severe Coronary Sclerosis with Obliteration of Lumen
  - 4 Severe Coronary Thrombosis Resulting in Death
- Heart Weight Given in Grams

onary disease among the hypertensive and nonhypertensive diabetic groups in contrast to the control series. Slight atheromatous changes occurred with equal frequency, but striking differences are noted in the occurrence of more advanced vascular changes. Severe degrees of obliterative coronary disease occurred in 60 per cent of the hypertensive group and in only 22 per cent of the nonhypertensive group of the same age. The total incidence of severe coronary disease in the 175 diabetic patients was 42 per cent, fatal coronary thrombosis occurred in 18 per cent. Deducting all patients under 40 years of age reveals an incidence of 46.7 per cent of severe coronary disease and 19.5 per cent of terminal coronary thrombosis.

erative changes in the coronary vessels. In the nonhypertensive group, coronary heart disease caused death in 12 patients (15 per cent). Three of these patients (Case Nos. 6,798, 5,248, 9,433) died of congestive heart failure following acute coronary thrombosis.

Myocardial degenerative changes occurred in 78 per cent of the hypertensive group of patients and in 43 per cent of the nonhypertensive group. By eliminating from consideration all patients under 40 years of age in the nonhypertensive group, this incidence would be raised to 52 per cent. The control series revealed an incidence of myocardial degeneration of 79 per cent. No striking differences were noted in the type or degree of arteriolar sclerosis in the two

groups of corresponding ages. The histologic changes associated with senescence predominated in each group.

Valvular sclerosis and atheromatosis occurred in 25 patients in the hypertensive group and in 7 patients in the nonhypertensive group.

The relationship of the weight of the heart to the degree of coronary sclerosis is indicated in table 1. In the hypertensive group the average weight of the heart was 407 grams while in the nonhypertensive group the average weight was 339 grams. If the patients under 40 years of age in the nonhypertensive group were excluded it would raise the average heart weight to 350 grams. In the hypertensive group the average heart weight for groups 3 and 4 was somewhat less than in the preceding groups. This was not true for the nonhypertensive diabetic patients or for the nondiabetic control groups, however. The fact that hypertrophy of the heart did not occur in a large number of patients with hypertension may be seen from an inspection of table 1. Indeed in a large number of cases the term 'atrophy' might be used in describing the size of the heart even though many of these patients exhibited signs of cardiac disease. The average heart weight for the control group was 352 grams.

We have arbitrarily chosen 350 grams as the upper limit of normal. Some authors have considered 450-500 grams to represent the upper limit of normal weight of the heart. Consequently it will be found that many more hearts have been included in the hypertrophic group than would be the case if we adopted the higher figures.

Gross acute infarction of the myocardium was observed in 25 cases in the hypertensive group while old infarcts were found in 21 cases. An unusually high incidence (4 cases) of rupture of the myocardium was found. Aneurysm of the ventricle occurred in one case. In the nonhypertensive group, gross acute infarction was present in 7 instances, while healed infarcts were found in 6 cases. Aneurysm of the ventricle was also observed in 1 case in this group.

The histopathologic changes were identical in type in both the hypertensive and nonhypertensive groups. They were essentially intimal changes of the atheromatous and fibrous proliferative types. The atheromatous changes predominated. These lesions were more commonly observed in the larger vessels of the coronary tree. Both the right and left coronary arteries and their larger branches were affected by the process. Coronary thrombosis occurred in the right side of the heart in only 1 case (Case No. 1177). The pathologic process was not uniformly diffuse, but occurred as a patchy lesion. Occlusive vascular changes in the coronary arteries were frequently associated with localized areas of myocardial atrophy which despite some

degree of adjacent compensatory hypertrophy did not increase the weight of the heart materially. Terminal thrombosis occurring at the site of an atherosclerotic plaque produced sudden death in 20 cases, 15 of these patients were in the hypertensive group.

Warren<sup>1</sup> found marked glycogenic infiltration of the heart muscle in many of these cases. It was particularly striking in the heart muscle fibres in the margins of the infarcts. Abnormally large storage of glycogen was found particularly in hearts subjected to fixation within thirty minutes after death. There was but little difference in the amount of glycogen stored in the hearts of diabetic patients who had received insulin and in the hearts of the control patients. In the hearts of diabetic patients not treated with insulin there was a high proportion showing heavy deposits of glycogen.

*Symptomatology.* When cardiac symptoms were present in this series of patients they were predominantly those associated with coronary heart disease. The most characteristic symptom of coronary disease in the patients comprising this series was the gradual onset of subternal pain of a relatively mild type first induced by effort and rarely so severe as to be incapacitating. Dyspnea of cardiac origin was not a common symptom. Nocturnal dyspnea or paroxysmal pulmonary edema rarely occurred. Prolonged heart failure was infrequent when it occurred it usually followed coronary thrombosis. Angina pectoris had been present in but 16 of the 32 patients with coronary thrombosis. The duration of symptoms was often only a few months before terminal coronary occlusion. In 8 of the cases of coronary thrombosis there was no history of pain. In 2 cases coronary thrombosis was signalized by the sudden onset of auricular fibrillation. In 2 cases, coronary thrombosis occurred in patients who had insulin hypoglycemia. It was not possible to show that the hypoglycemia preceded the coronary thrombosis.

#### INCIDENCE OF CORONARY THROMBOSIS

Such a high incidence of coronary thrombosis merits special attention. Of the 32 fatal cases comprising an incidence of 18 per cent of the 175 cases, 27 per cent occurred in the hypertensive group and 9 per cent in the nonhypertensive group. In the control group coronary thrombosis occurred in only 2 per cent.

*Sex.* Of the 32 patients with coronary thrombosis there were 18 women and 14 men. The preponderance of males over females in other reported series of autopsy studies on nondiabetic patients with coronary thrombosis was not found in this study.

*Age.* The average age at time of death was 61.7 years for the patients in the hypertensive

group and 54.7 years for those in the nonhypertensive group. The youngest patient (Case No. 1,794) was 33.5 years of age and the oldest (Case No. 5,480) was 82.7 years of age. There were 8 patients, 25 per cent of this group, who were 70 years of age or older. The average duration of diabetes for this group was 17.4 years, indicating a relatively mild type of diabetes. Such a high incidence of coronary thrombosis in this age group would tend to show a more significant relationship of the duration of diabetes mellitus to coronary sclerosis than of age or the severity of the diabetes.

**Obesity** Obesity maintained about the same relationship to patients with coronary thrombosis as obtained for the entire group. Eighty-eight per cent of the hypertensive patients had been obese, as compared with 71 per cent of those in the nonhypertensive group.

**Duration of Diabetes Mellitus** The average duration of diabetes in the group of hypertensive patients with coronary thrombosis was 11.6 years, the duration for nonhypertensive patients was 8.1 per cent years. Among the 8 cases in which coronary thrombosis occurred in patients past 70 years of age, the average duration of diabetes was 17.4 years. The majority of these patients had a mild type of diabetes, despite the fact that diffuse arteriosclerosis was found at postmortem examination in addition to coronary arterial disease. Coronary sclerosis, as with arteriosclerosis elsewhere, bore a closer relationship to the duration of the diabetes than it did to the severity of the diabetes or to the age of the patient.

#### DISCUSSION

In this series of 175 autopsied diabetic patients, arteriosclerosis was the cause of death in 116 (66 per cent). Forty-two per cent of the 175 patients died of severe coronary heart disease. Excluding all patients under 40 years of age, the incidence of severe coronary disease would be elevated to 47 per cent. Among the 175 patients there were 32 deaths attributable to acute coronary thrombosis, an incidence of 18 per cent. Deducting the number of patients under 40 years of age would raise this figure to 20 per cent. In 4 patients, rupture of the myocardium occurred at the site of infarction and in 2 instances aneurysm of the ventricle was found. Striking differences are shown when these figures are compared with those obtained from a study of the control series of 170 patients. Severe coronary disease (groups 3 and 4) occurred in only 13 per cent of the control patients, despite the fact that no patients under 40 years of age were selected and even though the average age for this group was 61.9 years. Coronary thrombosis occurred in only 4 patients (2 per cent). No cases of ruptured myo-

cardium or aneurysm of the ventricle were encountered.

Many observers, from Seegen in 1870 to Naunyn in 1906,<sup>2,3,4,5,6,7,8</sup> have noted the frequent association of coronary disease and diabetes mellitus. Since the advent of insulin the common association of diabetes and coronary heart disease has been emphasized by Root and Warren<sup>9</sup> and Nathanson.<sup>10</sup> The latter concluded that coronary disease is six and one half times as common in the diabetic individual above 50 years of age as it is in the nondiabetic patient of the same age group.

Wilder,<sup>11</sup> Blotner,<sup>12</sup> Rabinowitch<sup>13</sup> and, more recently, Enklewitz<sup>14</sup> have shown the great frequency of coronary thrombosis in the diabetic. In 10,000 patients with diabetes, Root<sup>15</sup> found that angina pectoris occurred in 410 cases.

On the other hand, diabetes is frequently found to be present in patients suffering from coronary thrombosis. Levine<sup>16</sup> found glycosuria or a previous history of diabetes in 23.7 per cent of 145 patients with coronary thrombosis.

Compared with other general autopsy series, the incidence of coronary thrombosis in the diabetic group of patients is striking. Benson and Hunter,<sup>17</sup> in a study of 1,750 autopsies performed in the coroner's service at Portland, Oregon, found coronary thrombosis in 4.1 per cent. One would expect a relatively high incidence of coronary thrombosis in a series of this origin. Ophuls<sup>18</sup> found only 18 cases of recent myocardial infarction in 3,000 nondiabetic autopsies. Coronary thrombosis was present in only 2 per cent of the cases in our nondiabetic control series. Meakins and Eakin<sup>19</sup> found only 62 cases of coronary thrombosis in 6,548 autopsied patients covering a period of 35 years; this series revealed a ratio of deaths from coronary thrombosis of 1/105.6 or 0.95 per cent.

The interrelationship of hypertension, hyperglycemia, obesity and arteriosclerosis has been emphasized by Herrick,<sup>20</sup> Kramer,<sup>21</sup> Musser and Wright<sup>22</sup> and others. The etiologic importance of obesity and diabetes is well appreciated. The exact relationship of obesity to hypertension is not definitely known. One-half of our patients had diabetes mellitus, obesity and a relatively high incidence of arteriosclerosis, yet hypertension was not present. It is true, however, that reduction of body weight in many patients with hypertension induces a favorable influence upon the blood pressure.

#### DURATION OF DIABETES MELLITUS

As indicated in table 1, the degree of coronary sclerosis, with occasional exceptions, bore a closer relationship to the duration of diabetes than it did to the age of the patient or the severity of the disease. The inclusion of 13 patients under 40 years of age appreciably lowered the average age level for the patients of the non-

hypertensive group. The average age of the patients with coronary thrombosis was appreciably lower than the age level of the patients showing a moderate degree of coronary sclerosis. This correlation of the existence of coronary sclerosis with the duration of diabetes parallels that found previously in diabetic patients with a duration of diabetes of five years or more. The average age in groups 1, 2 and 3 of coronary disease remained about the same. A lower average age was found in group 4 in both the hypertensive and nonhypertensive groups of patients (table 1). There is a steady progression of the severity of coronary arterio-sclerosis with a progression of the duration of diabetes mellitus despite the fact that there are no great changes in the average ages for the various groups. In both the hypertensive and nonhypertensive groups no coronary sclerosis was found in patients with an average duration of diabetes of less than five years.

In patients with diabetes of short duration there is no more arteriosclerosis than in non-diabetic patients. The excessive arteriosclerosis is found in diabetes of long duration. This correlation of the duration of diabetes mellitus to aortic atherosclerosis was previously reported by Root and Sharkey.<sup>23</sup> The effect of the duration of diabetes upon the degree of arterio-sclerosis is likewise demonstrated in the extremes of the age groups. In our series there were 2 patients with severe coronary disease under 40 years of age. Of these 1 died of coronary thrombosis. Root and Grzybicki<sup>24</sup> reported 2 cases of angina pectoris in patients between 20 and 30 years of age and 4 between 30 and 40 years of age. Three of these patients who had had diabetes for 5, 6 to 8 years died suddenly in two instances postmortem examination revealed acute coronary thrombosis.

Anderson<sup>25</sup> reported death of a 33 year old patient with cardiac decompensation secondary to coronary heart disease who had had diabetes for 14 years. Klingenberg<sup>26</sup> reported two similar occurrences in patients between the ages of 20 and 30 years in one an area of healed myocardial infarction was found at autopsy. Cullman and Graham<sup>27</sup> reported the death with coronary occlusion of a 27 year old patient who had had diabetes for 8 years.

In the other extreme of life we find that 25 per cent of our patients with coronary thrombosis were 70 years of age or over. The average duration of diabetes for this group was 17.4 years.

Eggleston<sup>28</sup> states that coronary thrombosis is uncommon in patients over 70 years of age. Willius<sup>29</sup> found only one instance of coronary thrombosis among 700 patients over 75 years of age. He attributes this to the fact that the majority of patients who reach advanced ages do so because they possess "a sturdy coronary tree".

Willius stated "The extremely small incidence of coronary thrombosis (0.3 per cent) in this series substantiates previous observations that its occurrence is most common between the fiftieth and seventieth years of life." In his series coronary disease was present in 44.7 per cent. In our series of diabetic patients the incidence of severe coronary disease was 42 per cent despite the fact that the average age of the patients of our series was approximately 13 years less than that in Willius's series.

Although diabetes develops most frequently at 51 years of age, angina pectoris occurs most frequently in diabetic patients during the decade in which patients who have had diabetes for 10 years or more are most frequently encountered, namely the seventh. White's<sup>30</sup> series reveals that the greatest frequency of onset of angina pectoris among nondiabetic patients occurs during the sixth decade. The later development of angina pectoris in diabetic patients appears to depend upon the fact that the exposure to diabetes of several years' duration is an important factor in the etiology. The frequency of angina pectoris trebles during the second decade of diabetes.

#### HYPERTENSION

The almost equal distribution of patients with hypertension and those without hypertension in our series provided an opportunity to compare the pathologic changes observed in the two groups. In general a greater frequency of hypertension in diabetic patients than in non-diabetics had been reported by many authors including Major,<sup>31</sup> Bell and Clawson,<sup>32</sup> Peterson,<sup>33</sup> Root and Grzybicki,<sup>24</sup> Koopman,<sup>34</sup> Rabinowitch et al.<sup>35</sup> and Nathanson.<sup>36</sup>

The type of hypertension occurring in our diabetic patients corresponded to the so called benign type. Few of the patients had symptoms attributable to the hypertension *per se*. There was a notable absence of headache, vasomotor disturbances, central nervous system symptoms or epistaxis. On the contrary Weiss<sup>37</sup> found only 11.8 per cent of 1090 ambulatory nondiabetic patients with hypertension to be free of symptoms ordinarily associated with this disease. So called malignant hypertension was not observed in any of our patients and none of the pathologic changes ordinarily associated with malignant hypertension were present. While the duration of hypertension in our patients was difficult to estimate it developed after the onset of the diabetes in many cases in which diabetes had existed for many years. While it is sometimes stated that diabetes is commonly found in persons with hypertension the autopsy records on patients with hypertension do not confirm this. Bell and Clawson<sup>32</sup> found diabetes to be present in only 5.5 per cent of the patients in their series. Murphy et

al<sup>38</sup> in their series of 375 autopsied patients with hypertension found a surprisingly low incidence (14 cases) of diabetes.\*

The effect exerted by hypertension can be estimated by a comparison of the pathologic changes in the diabetic and nondiabetic series. The nature of the pathologic changes was approximately the same in diabetics with or without hypertension, though the incidence of severe coronary atherosclerosis was greater in patients with hypertension. The average weight of the heart for the hypertensive group was 391 grams and for the nonhypertensive group 335 grams. The relative absence of any marked hypertrophy of the heart, even in patients with hypertension, is significant. This is in direct contrast to the average weight of the heart in the nondiabetic hypertensive patients. The more extensive pathologic changes in the hearts of diabetic patients with marked obstruction of the coronary circulation probably accounts for the lack of hypertrophy.

Congestive heart failure occurred but once in the diabetic group except as a result of coronary thrombosis. Congestive heart failure on the contrary was the chief cause of death in the hypertensive nondiabetics in Bell and Clawson's<sup>32</sup> series, it occurred in 44.5 per cent. The weight of the heart of these patients varied from 448 to 615 grams. Murphy et al<sup>38</sup> in their series of 375 hypertensive patients found only 18 per cent of the hearts to be of normal weight, the remainder varied from 400 to 1000 grams. Absence of marked cardiac hypertrophy and of congestive failure, even in the presence of hypertension, characterized the diabetic series.

Coronary disease as a cause of death was far more frequent in the diabetic than in the nondiabetic series. Only 2 per cent of the nondiabetics had coronary occlusion, whereas among the diabetics it occurred in 9 per cent of those without hypertension and in 27 per cent of those with hypertension.

#### DIABETES AS A CAUSE OF ARTERIOSCLEROSIS

Whether arteriosclerosis represents cause or effect of hypertension is not definitely proved, but the consensus at the present time (Bell and Clawson,<sup>32</sup> Fishberg,<sup>39</sup> Moschcowitz,<sup>40</sup> Musser,<sup>41</sup> Rabinowitch,<sup>35</sup> Allbut,<sup>42</sup> Mosenthal,<sup>43</sup> Yater,<sup>44</sup> Rice,<sup>45</sup> Goodridge,<sup>46</sup> White<sup>47</sup> and others) is that arteriosclerosis in many cases is an effect, rather than a cause, of hypertension. In this series coronary atherosclerosis stood in a much closer relationship to the duration of diabetes than to the age of the patient. The frequency of coronary thrombosis at the extremes of age, as reported by ourselves and other authors, is characteristic of diabetes. The sex relationship to severe coronary disease in our series is also

distinctive of diabetes. Eighteen of our 32 patients with acute coronary thrombosis were women. The higher incidence of coronary thrombosis in females is in direct contrast to other published reports on nondiabetic patients, such as Willus's<sup>48</sup> recent report in which the males outnumbered the females in the ratio of seven to one. Sprague and White<sup>48</sup> state that 90 per cent of their patients under 50 years of age with coronary heart disease were men.

Sprague and White<sup>48</sup> agree that diabetes favors the early appearance of coronary atherosclerosis. Warren<sup>49</sup> has emphasized the selectivity of the vascular pathologic lesions in diabetes. A characteristic type of intimal atherosclerosis is associated with diabetes, involving principally the muscular arteries, such as those of the heart and legs. This type of arteriosclerosis may be contrasted with that form which is seen in the average senile patient, involving chiefly the cerebral and renal vessels.

Among our 175 autopsied patients cerebral arteriosclerosis was no more frequently a cause of death than in nondiabetic patients. In only 1 case in our series could death be ascribed to nephrosclerosis. Further confirmation of the selectivity of the vascular pathologic lesions associated with diabetes is advanced by Waite and Beetham<sup>50</sup> who found retinal sclerosis to be as frequent in nondiabetic as in diabetic patients.

If it were true that diabetes mellitus occurs secondary to a generalized degenerative arteriosclerosis, especially localized in the pancreatic vessels, and that diabetes bears no causal relationship to arteriosclerosis, we would expect an increasing incidence of diabetes with age. Joslin<sup>51</sup> has shown that the maximum susceptibility to the development of diabetes occurs at 51 years of age for men and 55 years of age for women. In the later decades, when arteriosclerosis increases, diabetes decreases. Approximately one-third of the cases of diabetes develop during the first four decades. If arteriosclerosis is the cause of diabetes, one would expect some direct relationship between the degree of arteriosclerosis and the severity of the disease, such is not the case. Patients developing diabetes after the age of 60 almost invariably exhibit a mild type of the disease. In our autopsied series of 175 patients there were 46 with a duration of diabetes of 10 years or more. Arteriosclerosis was the cause of death in 66 per cent of these patients, coronary disease produced death in 52 per cent. The youngest patient was a man, 43 years of age (Case No 3,286), who had had diabetes for 151 years. This patient died of coronary heart disease, he showed evidence of retinal sclerosis with hemorrhages, had gangrene of his toes, and, at autopsy, revealed marked aortic atherosclerosis with calcification. The oldest patient, a woman, 83 years

\*Personal communication.

of age (Case No 5,480) had had diabetes for 33 7 years This patient died of coronary thrombosis, she had radial arteriosclerosis and gangrene of the legs and, at autopsy, marked aortic atherosclerosis with calcification and ulceration was found These 2 patients represent the extremes of life in this particular group, each died of coronary heart disease and showed diffuse arteriosclerosis The mildness of the diabetes in these two cases is indicated by its long duration To quote Woodruff: "No really severe diabetes would have continued for so long as this"

Pathologic evidence is likewise against the concept of arteriosclerosis as a cause of diabetes There was no more arteriosclerosis in patients who had had diabetes for a short interval than there was among nondiabetic patients Warren<sup>55</sup> found as much pancreatic arteriosclerosis in a control series of nondiabetic patients as he did in diabetic patients In his series of 359 diabetic cases in which it was possible to study the pancreas, no pathologic changes could be demonstrated in 69 cases (19 per cent) Furthermore, a high incidence of pancreatic arteriolar sclerosis is reported in hypertensive patients without diabetes

Fahr<sup>54</sup> found that the small arteries of the pancreas are usually sclerotic in cases of hypertension Bell and Clawson<sup>52</sup> expressed the impression that pancreatic arteriolar sclerosis was as common in their series as in Fishberg's series, yet diabetes had been present in only 5 per cent of patients over 50 years of age Murphy et al<sup>58</sup> found arteriolar lesions in the pancreas similar to those found in the kidneys in patients with hypertension

The mechanism by which diabetes induces the development of atherosclerosis is still under discussion The evidence suggests that cholesterol metabolism is a primary factor The work of Virchow<sup>55</sup> and Aschoff<sup>56</sup> suggested that the development of atherosclerosis was related to disturbances of cholesterol metabolism More recently other authors (Minovic and Vanghelo vic<sup>57</sup> Labbé and Hertz<sup>58</sup> Lehnherr<sup>59</sup> Gibbs Buckner and Bloor,<sup>60</sup> Schonheimer,<sup>61</sup> Warren<sup>62</sup> Rabinowitch<sup>63</sup> and others) have provided further evidence of an etiologic association between cholesterolemia and the premature and excessive production of atherosclerosis in the diabetic patient The most convincing recent work on this subject is that of Leary<sup>63</sup> who has reproduced typical coronary atherosclerosis with occlusion in animals by feeding cholesterol As noted in the first report of autopsies from the Deaconess Hospital, the frequency and advanced character of coronary and general atherosclerosis is most clearly explained by the disturbances in lipid metabolism Other factors, such as hereditary, stresses and endocrine influ-

ences, may play a part, but the abnormal cholesterol metabolism appears to be the most important cause

#### TREATMENT

The usual cardiac drugs have proved to be of limited value in the treatment of coronary heart disease occurring in patients with diabetes mellitus Drugs with vasodilator action, such as nitroglycerin, have been used, but most patients place more reliance upon restriction of activity and periods of rest Surgical measures have not been recommended because the pain is rarely of a severe degree and the extent of the coronary sclerosis is usually quite advanced

Insulin administration in the diabetic patient with coronary heart disease should be accurately gauged on the basis of frequent blood sugar and urine analyses It is unfortunate that reports of isolated instances of the development of angina pectoris or coronary thrombosis following insulin-hypoglycemia have led to considerable prejudice against the use of insulin The carefully controlled administration of insulin in cases of coronary heart disease in diabetic patients is of proved value A marked loss in carbohydrate tolerance occurs in some cases of coronary thrombosis, particularly if congestive heart failure is present Insulin therapy is of distinct value in such cases Hepburn and Latchford<sup>64</sup> have shown that insulin therapy increased the average sugar consumption of the heart muscle from the normal rate of 0.87 milligrams per hour to 3.06 milligrams per hour Lymburner<sup>65</sup> has described a patient who had experienced a severe attack of angina pectoris, possibly following coronary occlusion, and who was given 250 units of insulin within twelve hours with excellent results The recovery of many diabetic patients following coronary occlusion provides evidence that uncontrolled diabetes in such patients should be regulated by the judicious use of insulin

#### SUMMARY AND CONCLUSIONS

1 Among 175 diabetic patients who were subjected to postmortem examination coronary arteriosclerosis was the most common cardiac lesion and was present in some degree in 132 cases

2 The clinical symptoms of cardiac disease, when present, were those of coronary sclerosis Angina pectoris was always associated with severe coronary disease

3 The degree of coronary sclerosis bore a more definite relationship to the duration of the diabetes than it did to the age of the individual or the severity of the disease This relationship held true for both hypertensive and nonhypertensive diabetic patients

4 A much higher incidence of severe cor-

onary disease was encountered in those cases in which diabetes and hypertension co-existed

5 The incidence of coronary thrombosis in the diabetic patients was much higher than it was in a comparable control series of nondiabetic patients or in other reported series of general autopsy material. Coronary thrombosis occurred with approximately four times greater frequency in the diabetic patients with hypertension than it did in diabetic patients without hypertension.

6 Pathologic changes of an atherosclerotic nature were found most consistently in the main coronary arteries and their larger branches.

7 Cardiac hypertrophy was not encountered so frequently as one would expect in diabetic patients with hypertension.

8 A statistical analysis of the incidence of diabetes, combined with a study of pathologic changes found at autopsy, reveals no evidence that arteriosclerosis is a cause of diabetes.

9 Prolonged duration of diabetes mellitus exerts a marked etiologic influence on the development of atherosclerosis.

10 The occurrence of coronary thrombosis in diabetic patients is not a contraindication to the employment of insulin therapy.

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## CONGENITAL DISLOCATION OF THE HIP\*

## An End-Result Study with Suggestions for Improved Treatment

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THE purpose of this paper is to present a brief survey of the experiences of the orthopedic staff of the Massachusetts General Hospital with congenital dislocation of the hip.

All of the cases treated during a ten year period (1923-1933) have been reviewed and classified according to the method of treatment employed. There were 58 cases in all representing a total of 73 dislocated hips. Of these only 46 patients comprising 55 hips could be followed to the end-result.

The treatment of these cases was shared by different members of the orthopedic staff and consisted in closed reductions, open reductions open reductions with shelves and shelf operations alone depending upon the nature of the case. Traction of the Hoke type or by Kirschner wire has been used both before and after reduction in about one-half of the open reduction cases. No Lorenz bifurcation operations or Shanz osteotomies have been performed. The method of closed reduction employed was that which was advocated by Denucci.<sup>1</sup> The open reductions were all performed through the Smith-Petersen approach to the hip. In those cases where shelves were employed various kinds were constructed but chiefly the turning down of a bone flap from the blade of the ilium plus a bone wedge to retain the flap in its position. In several instances a "trap door" type of bone shelf was used raising the bone ledge from below upward. Also in a few cases, full thickness grafts were taken from the tibia and driven at right angles into slots in the ilium thus producing a roof over the femoral head.

The age factor has always been considered of paramount importance in congenital dislocation of the hip and cases are therefore frequently separated into different age groups so far as treatment is concerned.

Dickson<sup>2</sup> for instance, speaks of three groups in which "Group I" comprises patients up to 4 years of age, "Group II," patients from 4 years to 9 years of age, "Group III" patients over 9 years of age. In Group I (up to 4 years) he recommends closed reduction. In Group II (4 years to 9 years) open reduction is advised. In Group III (over 9 years) shelf operations are the procedure of choice. Other writers suggest different age groups.

Galloway<sup>3</sup> places the age period from 2 to 3 years as the ideal age for open operation.

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Kidner<sup>4</sup> believes that even in very young children open operation is preferable to the closed method, unless reduction by the closed method can be easily obtained with a minimum amount of force and with a stable hip immediately following manipulation.

Farrell and Howarth<sup>5</sup> state that "closed reduction" is the operation of choice in infants younger than 1 year. Between the ages of 1 and 3 years they suggest that a single gentle manipulation first be attempted, if not successful then open reduction. They believe that shelf stabilization without reduction is usually preferable in children over 6 years of age.

Gill<sup>6</sup> always attempts closed reduction in children under 5 years of age unless the joint is abnormally rigid or the x-ray shows too much obliteration of the acetabulum. Over 5 years of age he advises the open operation and always combines it with a shelf operation.

At the Massachusetts General Hospital no arbitrary age limits have been used in determining the type of operation to be performed. As a rule closed reduction has been reserved for children under 5 years of age unless special contraindications were apparent.

Open reductions have been performed in children over 5 and in younger children where the closed method had failed.

In the series of open reductions a shelf operation was added only in those cases that exhibited an incompetent acetabulum.

"Shelf operations alone" were performed in adults and in those children whose hips obviously could not be reduced without great trauma. In such instances the femoral head was allowed to remain in the false acetabulum.

In the series of cases to be discussed here, the ages of the patients were as follows:

Under 6 years of age	16
6 years to 15 years	18
15 years to 30 years	11
Over 30 years	2

Of the 55 dislocated hips with end-results, 16 were treated by closed reduction, 15 by open reduction, 8 by open reduction plus a shelf, and 16 by the shelf operation alone.

Following closed reduction, it has been the custom at the Massachusetts General Hospital to immobilize the hip in its most secure position of reduction for a period of about six months and then gradually in successive stages to allow the leg to assume its normal anatomic position, the entire period of plaster retention not exceeding nine to ten months.

In other orthopedic clinics (A. B. Gill) the



reduced hip is fixed in a plaster cast for only four months, in the belief that if the head of the femur will not remain in the acetabulum after four months in plaster, the probabilities are that it will not do so even after ten or twelve months in plaster. Should the hip redislocate after this period of four months' fixation, an open reduction is definitely indicated.

For the postoperative treatment of open reductions Farrell and Howorth<sup>5</sup> apply a plaster-of-Paris hip spica for two and one-half to three months. Active motion is begun promptly upon the removal of the plaster but weight-bearing is usually delayed from one to three weeks. They believe that mobilization of the joint should be begun at the earliest safe moment but that weight-bearing should be delayed until the extremity has recovered sufficient function.

Cole<sup>6</sup> makes the period of fixation in plaster for these hips two to four months, Kidner<sup>4</sup> three months.

The author agrees with these writers that the period of fixation in plaster should be much shorter after open reduction than after the closed method, but would make no arbitrary time limits, preferring to regulate the immobilization period according to the needs of the individual case. Some openly reduced hips will require no more than two months of immobilization, while others, because of anatomic changes about the head and neck, may require a much longer time.

Following plaster-of-Paris fixation, the early use of active motion and leg exercises under proper supervision is very important, but unfortunately often neglected in large hospital clinics.

#### END RESULTS

It is very difficult to estimate accurately end-results in congenital dislocation of the hip. Since the mechanics and structure of the reduced hips change as time goes on, there is no one period that can be selected for a definite end-result.

What may be taken for an end-result at two years after reduction, may be entirely different ten years postoperatively. Traumatic arthritis, obesity, occupation, economic demands, and so forth all have their effects upon the susceptible joint, and what might be considered a good early operative result, often, in the course of time, becomes a poor end-result.

Then, too, what may be considered a satisfactory or good result by one surgeon may be considered a poor result by another. There is no standard measuring stick that has been universally adopted, and individual statistics are therefore, difficult of interpretation.

The evaluation of results in this series of cases is entirely a personal one and must be looked upon as relative.

In general, the result termed "Excellent" in this paper signifies a perfect clinical result without a limp, Trendelenburg sign, disability, loss of motion, shortening or atrophy, and with an x-ray in which the changes shown are insignificant. "Good" means an excellent clinical result without disability but with a slight limp, Trendelenburg sign, slight limitation of motion and significant x-ray changes. "Fair" means definite restriction of motion in more than one direction with some disability, but no marked pain. "Poor" means only a small range of motion with marked limp, shortening, considerable disability and pain.

#### Closed Reductions

Of the closed reductions, of which there were 16, 10 hips or 62 per cent showed "excellent" end-results, 4 hips or 25 per cent were classified as "good" results, and 2 hips or 12.5 per cent showed a "fair" result.

#### Open Reductions

Of the open reductions, of which there were 15, only 1 hip or 7 per cent was rated "excellent", 3 hips or 20 per cent rated as "good", 5 hips or 33 per cent rated as "fair", 4 hips or 27 per cent rated as "poor", and 2 hips or 13 per cent resulted in bony ankylosis. These last 2 hips which ankylosed were in individuals of 17 years and 39 years of age, and in both cases a stripping of all of the attachments from the neck and trochanter of the femurs was done preliminary to heavy traction and open reduction. Of the 4 hips rated "poor", 1 case redislocated and the patient refused further treatment, the second case had all of the structures about the neck and trochanter released and heavy traction employed prior to an attempt at open reduction. In the remaining 2 hips no definite cause for the poor results could be ascertained in view of the fact that the patients returned to the clinic only once, and x-rays and sufficient data were lacking.

#### Open Reductions Plus a Shelf

Of the hips which were treated by "open reduction plus a shelf," of which there were 8, no single case has been recorded as an "excellent" end-result. Two hips or 25 per cent showed "good" end-results, 1 hip or 12.5 per cent showed a "fair" result, 2 hips or 25 per cent were rated as "poor", and 3 hips or 37.5 per cent resulted in bony ankylosis. Of the 2 cases reported as "poor", one had an open reduction which was difficult and a skid had to be used to secure reduction. A "trap-door" type of shelf was also employed, and later a subtrochanteric osteotomy was done to correct the marked adduction deformity. All of these procedures were unsuccessful in securing a good result and finally a fusion operation was performed. In the remaining case, the open re-

duction was accompanied by a plastic operation on the head of the femur and new bone formation developed, which accounted for the poor result. Of the 3 hips which became ankylosed 1 had the two stage operation with release of all structures from the neck and trochanters plus heavy traction preliminary to the reduction and the third also had a plastic operation on the head of the femur and it was stated in the operative note that very poor cartilage remained.

#### *Shelf Operations Alone*

Of the hips which were treated by a "shelf operation alone," of which there were 16, no cases were considered as "excellent", but 8 hips or 50 per cent were recorded as "good" and results, 4 hips or 25 per cent were considered "fair", and 4 hips or 25 per cent had "poor" end-results. An analysis of the "poor" end results showed 1 hip with a considerable amount of new bone formation about the upper margins of the femoral shaft and the patient complained of pain and disability which was more marked after operation than before, another hip, in a patient 40 years of age, was treated by a plastic operation on the femoral head as well as a shelf and the result was marked limitation of motion plus pain, so that eventually an arthroplasty was performed, in the 2 remaining cases, the dislocations were due to infantile paralysis and in both instances the formation of a shelf failed to stabilize the hip joints, and in 1 of these cases an arthrodesis had to be performed.

Summarizing these statistics in a little different way, it might be stated that good functional results were obtained in 88 per cent of the closed reductions, in 27 per cent of the open reductions, in 25 per cent of the "open reductions plus shelves", and in 50 per cent of the cases having shelf stabilizations alone.

These end-results are far from satisfactory but it must be recognized that two-thirds of the patients in this study were over 5 years of age when treated and that perfect results are impossible to obtain in individuals of more advanced age.

#### CONCLUSIONS

- 1 Closed reduction in infants gives promise of the best end-results in congenital dislocation of the hip, and early diagnosis is the most important step toward this end.
- 2 In order to obtain better results in the treatment of congenital dislocation of the hip we must eliminate entirely those procedures that entail the use of force or undue trauma.

- 3 In every instance where undue force was employed in securing reduction, the end-result was disappointing and function sacrificed.
- 4 Traction by the Hoke method or with a Kirschner wire, preliminary to reduction, was effective in drawing the femoral head down opposite the acetabulum in practically all of the cases in which it was tried.
- 5 Open reductions that required instrumental leverage or heavy traction usually resulted in marked limitation of motion or ankylosis.
- 6 Stripping of the neck and trochanters of the femur to gain length and secure reduction, ended disastrously in every case so far as future motion in the joint was concerned.
- 7 Plastic operations on the femoral head or on the acetabulum should never be done without the knowledge that function will be severely impaired thereby rather than improved.
- 8 Shelf operations have proved their worth in the treatment of congenital dislocations of the hip and it would seem a wise precaution to add this procedure in all cases of open reduction.
- 9 Nothing conclusive can be stated from this small series of cases as to the relative merits of the different types of shelf operations.
- 10 Shelf operations alone are rarely successful in infantile paralysis cases where the hip muscles are involved.
- 11 Were we to formulate any general rules from our experience as to the optimum time and method of operation in these cases, we must conclude that
  - 1 Gentle closed reduction should be attempted in all children under 3 years of age. If reduction fails or if the hip is not secure after six months in plaster, open reduction is indicated.
  - 2 In children over 3 years of age open reduction is advised and reduction accomplished if at all feasible. However the decision of whether to reduce the hip or stabilize it unreduced by a shelf, should be made at the time of operation. Should reduction necessitate the use of force or instrument leverage or mechanical traction, it is contraindicated and a shelf stabilization should be substituted as the procedure of choice.
  - 3 In individuals over the age of 9 to 10 years the shelf stabilization operation alone is indicated.

## END RESULTS OF TREATMENT IN CONGENITAL DISLOCATION OF THE HIP

	Number of Cases	Excellent	Good	Fair	Poor	Ankylosis
Closed reductions	16	10	4	2	0	0
Open reductions	15	1	3	5	4	2
Open reductions plus shelf	8	0	2	1	2	3
Shelf operation only	16	0	8	4	4	0
Total	55	11	17	12	10	5

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## CAFFEINE INTOXICATION

## Report of a Case the Symptoms of which Amounted to a Psychosis

BY MARGARET C. McMANAMY, M.D.<sup>1</sup> AND PURCELL G. SCHUBE, M.D.<sup>2</sup>

CAFFEINE is a trimethylxanthine compound which for many years has been successfully and widely employed as a drug and as an article in diet. It is a purine derivative and is closely allied to purine bases (xanthin, adenine, guanidine) and to commercial adrenalin, which is in turn related to meret (epinephrine, Abel) of the suprarenal glands of vertebrates. It is also closely allied to other xanthin bodies found in the urine and tissues of animals.

The pharmacologic action of caffeine can be summarized as follows:

- (1) It stimulates the central nervous system
- (2) It increases muscle irritability, absolute strength and extensibility in small doses and in large doses produces muscle stiffness and hardness
- (3) It produces no important change in pulse rate, volume or blood pressure in ordinary doses, but in large intravenous doses the heart is accelerated to final weakness and irregularity, the blood pressure rises slightly, and the peripheral blood vessels dilate
- (4) It quickens respiration, making it more shallow but aerating the blood better
- (5) It increases the body temperature slightly
- (6) It increases the secretion of urine over and above the total intake, decreasing thereby the various body fluids

According to Cushny<sup>1</sup> the stimulation of the central nervous system by caffeine is particularly evident in that part associated with the higher psychic functions. "The ideas become clearer, thought flows more easily and rapidly and fatigue and drowsiness disappear. Not infrequently, however, connected thought is rendered more difficult, for impressions follow each other so rapidly that the attention is distracted, and it requires more and more effort to limit it to a single object. If the quantity ingested is small, however, the results are of distinct benefit in intellectual work. The capacity for physical exertion is also augmented, as has been demonstrated repeatedly by soldiers on the march and, more recently, by more exact experiments with the ergograph. The stimulation of the higher nervous centers is often manifested in the insomnia and restlessness which in many people follow indulgence in coffee or tea late at night. Kraepelin<sup>2</sup> has investigated the effects of caffeine from the psychologic point of view and finds that both tea and coffee facilitate the reception of sensory impressions and also the association of ideas, especially in fatigue, while the transformation of intellectual conceptions into actual movements is retarded. Thus he regards as due to stimulation of the highest or controlling functions of the brain, caffeine acting on the same parts as are first affected by alcohol and the methane derivatives, but altering them in the opposite direction. The effect of caffeine on the acuteness of the senses has been demonstrated by the greater accuracy of touch under its influence."

"Large quantities of caffeine often cause headaches and some confusion and in rare cases of special susceptibility a mild form of delirium may be elicited or noises in the ears and flashes of light may indicate derangement of the special senses. The pulse is quickened, and occasionally palpitation and uneasiness in the region of the heart are complained of. Convulsive movements of the muscles of the hand and tremor in different parts of the body have also been recorded in some cases."

Thus caffeine when used or prescribed intelligently is of definite value in human economy. When used or prescribed ignorantly

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or carelessly, it is probable that sooner or later intoxicating effects will manifest themselves.

It is the purpose of this paper to present a case in which caffeine in both small and large quantities was able to produce such an abnormal mental state as to necessitate hospitalization.

#### CASE HISTORY

The patient (W M No 33907) a twenty four year old white female was admitted to the hospital because she was excited noisy and had a tendency to stereotypy in her emotions.

**Family History**—The paternal grandfather deserted his wife and she a dominating strong minded person brought up her family alone. The patient's father although a large man is constantly intimidated by his wife who has a violent temper and rules the family to the point of periodically driving them from the home. At times she is very abusive verbally and physically and makes extremely unjust accusations. The patient is the second of seven siblings. The oldest a boy had rheumatic fever and chorea. The third a girl died of a brain tumor. The remaining four are girls and all are well. A maternal uncle was a patient at a mental hospital and eventually died from a cut throat. A maternal aunt had a short period of depression at the age of forty five years.

**Personal History**—Her birth and early development were normal. She had the usual childhood diseases. At the age of nine years she had epidemic influenza at which time she was quite ill. After this she had rheumatic fever from which she retains a rheumatic heart. She has had several subsequent debilitating attacks of rheumatic fever. In 1933 she had an appendectomy after which she developed menorrhagia and metrorrhagia. Her periods have occurred every two weeks with excessive flowing whereas prior to that and since their onset at the age of fourteen years they were regular. Her personality make-up varies with the informant. Her mother describes her as an irritable nervous high strung and defiant person. Her father describes her as being perfectly normal. Her friends say she is friendly sociable cheerful and a fairly good mixer. Her employer describes her as steady likable and dependable.

**Present Illness**—In the spring of 1935 because of persistent fatigue and exhaustion which had lasted for three years and which was interfering with her working efficiency she went to a general hospital for observation and treatment. The interne to whom she was assigned told her that there was nothing wrong with her and that she was psychoneurotic. She accepted his statements and advice and began to force herself to keep active in spite of her fatigue. During the fall and winter of 1935 her feelings of fatigue and exhaustion increased. On the advice of this same individual she began taking caffeine citrate gr  $1\frac{1}{2}$  three times a day. This made her feel more energetic but she became nervous restless and could not sleep at night. For her insomnia she was given phenobarbital.

On February 25 1936 she was planning to attend a party. In order to give herself a feeling of well being and to pep her up so that she could enjoy the party she took several of the one and a half grain caffeine citrate tablets. Shortly afterwards she became silly elated and euphoric. As hours passed she consumed more and more of the tablets until before the party started she had taken the contents of the box—forty tablets sixty grains. She became confused disoriented excited restless and violent shouted and screamed and began to throw things about her room. She became exceedingly

profane. Finally she collapsed and was removed to a general hospital where on admission she spoke in a somewhat manic way and was very uncommunicative. She was in some distress talking rapidly with flight of ideas. Her physical examination showed a well developed and well nourished girl with a few purpuric areas of skin. Her heart was enlarged to the left the rate was rapid and the rhythm regular with a rough systolic murmur at the apex. The liver edge was palpable there was tenderness in her midsternal line. The knee jerks were diminished. The blood pressure was 110/65 the temperature 99 the pulse 95 and the respirations 20. Laboratory examinations 8 urines were negative except for a very slight trace to a slightly perceptible trace of albumin in four and 1015 to 35 white blood corpuscles in three specific gravity to 1.025 the blood contained 4 800 000 red blood corpuscles with a hemoglobin of 90 per cent. There were 7 800 white blood corpuscles but on February 26 two days later they started to rise reaching 13 300 on March 10 with a fall to normal one week later the platelet count was normal. On February 26 it was stated that Patient has had a difficult situation financially and in her relationships with the nuns boys and so forth. Impression Hysteria. During the patient's stay in the hospital from February 25 to March 26 her psychosis gradually subsided. Those caring for her felt that the patient's behavior was due to a conflict between her intense religious fanaticism and her occupation as a check room girl with its associations and temptations. After her first week the manic state had completely disappeared but she was still very uncooperative and very unmanageable. During the second week numerous ecchymotic areas appeared on various parts of her body. Bleeding and clotting times were  $3\frac{1}{2}$  minutes and 3 minutes respectively. The tourniquet test was negative. Sedimentation rate was low and the white count was slightly elevated. These ecchymotic areas it was believed were probably due to an abnormal capillary fragility which was normal for the patient. During the middle of the third week she began to run an elevated temperature up to 99.5° which fell again to normal toward the end of the fourth week. No explanation for this temperature was found. She was then discharged with the psychiatric diagnosis psychoneurosis anxiety type with a hysterical episode.

Her next episode occurred on April 1 shortly after she had recovered from an attack of rheumatic fever. Again because of her feeling of fatigue and exhaustion she took caffeine citrate to make her feel better. After taking a few of the one and a half grain tablets she rapidly became confused disoriented and irresponsible and before long had taken the entire contents of the box—fifty tablets seventy five grains. She became unmanageable screamed laughed and cried. She was admitted to a general hospital in an irrational state varying from wild manic screaming kicking and biting to muttering semistupor. Physically she showed a few purpuric spots on her skin her heart was enlarged to the left rapid and regular with a rough systolic murmur at the apex. The liver edge was palpable and there was exquisite tenderness at the midsternal line. Her blood pressure was 110/65 temperature 97 pulse 86 and respirations 28. Blood examination showed 4 680 000 red blood cells and 12 400 white blood cells with a hemoglobin of 89 per cent. The differential count was normal. A consultation stated Hysteria without question. From April 1 to April 3 she failed to show symptomatic improvement while on the ward and continued wildly manic. It was felt that her condition "might be hysteria rather than a serious psychosis. She was given the psychiatric diagnosis acute manic

hysteria questioned early manic depressive psychosis and psychoneurosis anxiety type, with a hysterical episode. On April 3 she was sent to the Psychiatric Clinic of the Boston State Hospital.

On admission she appeared as though she were intoxicated. Her speech was thick and somewhat incoherent. She could not be induced to stand or walk. In bed she tossed and rolled so that she was in danger of falling out. She was resistive and it was necessary to restrain her.

Physical examination showed her to be a tall, pale, asthenic and well-nourished girl with several areas of ecchymosis on her body. The pupils of her eyes were small, round, equal and regular and reacted to light. The fundi were normal. She complained of difficulty in seeing and of cloudy vision. Her ears, nose and throat were negative. Her mouth and tongue were dry. Her lungs were normal. Her heart was slightly enlarged to the left. There was a soft blowing systolic murmur heard over the mitral area and transmitted to the left. The blood pressure was 110/70. There was no evidence of sclerosis of the vessels. The abdomen and genitalia were negative, although she complained of backache and pain on voiding. The extremities were normal. Neurologic examination showed all her reflexes both deep and superficial to be hyperactive. There was no muscle twitching. She was extremely hyperesthetic, the slightest touch caused her very definite pain. The temperature was 99° pulse 70 respirations 20.

Laboratory examination this time showed: Urine—straw colored, specific gravity 1.026, acid, slight trace of albumin, ammonium urates and a few epithelial cells in the sediment. Blood—hemoglobin 80 per cent, red blood cells 4,300,000, white blood cells 10,300, differential: neutrophils 62 per cent, large lymphocytes 22 per cent, small lymphocytes 12 per cent, monocytes 2 per cent and eosinophiles 2 per cent, with platelets abundant, slight achromia, polikocytosis and anisocytosis. Clotting time 5 minutes. Hinton reaction negative on blood serum. Basal metabolism rate, -4 per cent.

Mental examination showed a young girl lying in bed in restraint. She appeared to be of average intelligence and an intelligence test given about four weeks later confirmed this (I Q 93 M. A. 14 years, 10 months—normal intelligence). She still appeared narcotized, her speech was thick and her eyes rolled up. Her flow of thought and speech was rambling and she often lost the thread of the conversation. She was confused and answered questions incompletely, showing some distractibility but no true flight of ideas. Her psychomotor activity was increased in a purposeless manner. She pulled at the restraint and tossed about continuously. She cried out and screamed. Her emotional tone was one of depression and anxiety. There was no euphoria or sense of well-being. Her mental content could not be obtained but she did not appear to be hallucinated nor did she react to any delusions. She was correctly oriented for person. She knew the year but not the day of the month. She thought she was in prison. Her memory could not be adequately tested because of lack of co-operation, but she gave her own history in a fragmentary way but not chronologically. Her attention wandered so that general information could not be obtained. She was so confused that she could not do simple calculations. She had partial insight into the cause of her condition and the oddity of her behavior, but her judgment was impaired.

*Clinical Course*—During the first day or two of her stay it was necessary to restrain her because of her tossing and rolling. In spite of this she was extremely drowsy and her speech was very thick. She slept most of the time but could easily be

roused. On each succeeding day, however, there was a very definite and rapid improvement in her condition so that on April 10 she was mentally clear and could give an excellent account of herself. Her vision was entirely normal. She was definitely emotionally unstable, crying, laughing and giggling easily. She felt weak and exhausted and had to remain in bed. By April 17 she was sitting up in a chair and was stable emotionally except for a mild depression. She had excellent insight into her condition. On April 25 her B. M. R. was -12 per cent. By May 3 she had entirely recovered from her psychosis and was feeling quite well. However, she was felt to be somewhat emotionally unstable in that she was easily moved to pity, sympathy, devotion or cynicism and her feelings were easily hurt. On May 22 her hemoglobin was 80 per cent and her red blood cell count 4,400,000. Her basal metabolism rate was +10 per cent. On May 26 her hemoglobin was 74 per cent, her red blood cell count 4,360,000 and her white blood cell count 9,050 with neutrophils 68 per cent, small lymphocytes 21 per cent, eosinophiles 1 per cent and transitionals 10 per cent. Shortly after this she was observed to be rather silly, laughing and giggling. She was somewhat nervous. Investigation showed that she was drinking coffee four cups a day, to overcome her feelings of fatigue—this in spite of her insight and of therapeutic interviews in this respect. Coffee and tea were removed from her vicinity and soon she again became entirely normal and was dismissed from the hospital.

#### DISCUSSION

Caffeine intoxication is a state of poisoning which is not often encountered, this is particularly true when the vast amount of caffeine which is used for medical purposes and in articles of diet and refreshment is considered. The literature on this subject, moreover, is not very abundant. Much has been written in a general and from a purely neurologic<sup>3</sup> or didactic psychological<sup>4</sup> point of view—all or most all of the work being controlled or partially controlled laboratory work. The psychiatric aspects of caffeine intoxication are extremely meager and have been neglected.

In 1914, Orendorff,<sup>5</sup> in a letter to the Editor of the *Journal of the American Medical Association*, described the case of an eighteen year old girl who was slightly frail of stature and of frail physique. For four years she had had ordinary symptoms of asthenopia, which had been worse for several months. Correct eye glasses gave no relief. She "became eccentric, stubborn, at times exhilarated, then depressed, and would exhibit lapses of memory and deportment with indifference to the usual conventionalities and proprieties." Headaches were intermittent. She had insomnia at night and would fall asleep during the day at her work. Investigation of her case showed that she was drinking three to six glasses of coca-cola a day and two to three cups of strong coffee at mealtimes. Curtailment of the amount of daily caffeine ingestion caused prompt improvement in all symptoms.

In 1920 Brandenburg<sup>6</sup> described and sum-

marized the symptoms of the coffee addicts he had observed as vertigo, anxious feelings, weakness, weak spells, agitation and a heavy feeling of the heart

In 1925 Powers<sup>7</sup> reported the symptoms of twenty cases of coffee intoxication, stating that he had observed thirty-six. The symptoms occurred as follows: vertigo twelve cases, headache eleven, nervousness eleven, visual disturbance six, insomnia four, nausea three, tinnitus three, cardiac arrhythmia two, abasia two, projectile vomiting one, acosyncope one and anginal pains one. He describes the syndrome of coffee intoxication as vertigo, headache, scotomata and nervous irritability, with some times other symptoms produced by toxic effect on various parts of the nervous system either peripheral or central. Powers reported two interesting cases. In one there was a rhythmic tremor of the left eyelid, twitching of the facial muscles on the left side and tremor of the tongue and hands. When coffee was removed from the patient's diet the symptoms disappeared. In the second case there was headache, cloudy vision, nervousness, weakness and feelings of constriction of the throat for about a year. She was treated as a psychoneurotic without any benefit, but when she refrained from drinking coffee her difficulties disappeared.

The case which we have presented is a fairly clear cut one of caffeine intoxication, the syndrome having been repeated several times and the relationship between the caffeine and the psychosis established. The symptoms of the psychosis were essentially those of the manic depressive group with interspersed elements of a delirium and confusion. Some neurotic elements were likewise present but were not unusual. Her fatigue and exhaustibility were certainly not psychoneurotic and her excitement was certainly not explainable upon a hysterical basis. This being true, some sensible speculation of the mechanisms involved is reasonably justified.

The family history of the patient both remote and immediate is definitely pathologic. Her parents were sufficiently badly matched that a most unpleasant home situation existed and against which the patient endowed with an unstable constitutional make-up, reacted in a very sensible manner. Instead of trying to fight the situation or to get along in it, she left home and attempted to earn her own living. She did this rather well even though somewhat handicapped by her rheumatic heart which incapacitated her at intervals and which induced in her a lessened capacity for work. As a result of this lessened capacity and a position which entailed much lifting and standing, she was fatigued and exhausted at times—sometimes so much so that she became nauseated and vomited.

This fatigue and exhaustion were wrongly diagnosed as symptoms of a psychoneurosis, which resulted in poorly prescribed therapy, such as for her to "push herself" and to take caffeine to "pep her up." When the caffeine had produced nervousness and insomnia, phenobarbital was prescribed to permit her to sleep. This continued until she was so intoxicated from caffeine and possibly from the barbiturate, that she became confused and in her confusion, took enough caffeine to precipitate a psychosis severe enough to necessitate hospitalization upon two different occasions. The second psychotic episode in the opinion of the writers, was gross evidence of poor judgment in a girl of normal intelligence and good insight.

The real problem at hand is why did the girl react so easily to caffeine? There is some additional information which helps to clear this up. In interviews with her it was found that at one time bromides were prescribed after she had had an attack of sore throat and rheumatic aches and pains. Whenever she took the prescription she would become cyanotic and depressed and stagger as though she were drunk. Aspirin which she occasionally took for headaches would make her feel silly and light-headed. Smoking cigarettes would lessen her fatigue somewhat. An ordinary alcoholic drink would intoxicate her. A cup of coffee or tea would diminish her fatigue, make her feel better and stimulate her. These facts alone are sufficient to make one feel that this girl is abnormally sensitive to drugs of many sorts and the type of sensitivity would indicate a very unstable autonomic nervous system.

Further investigation at the Clinic showed that she was not only sensitive to drugs but also markedly sensitive to certain proteins. She gave a strongly positive reaction to the von Pirquet test, so much so that a chest plate was immediately taken. Her Schick test as well as the control, was strongly positive. Such additional marked sensitivity caused us to search for other evidence which might indicate that the entire basis might be allergic.

At the 1936 meeting of the Association for Study of Allergy, Squier and Madison<sup>8</sup> pointed out that allergy is apparently one cause of thrombocytopenic purpura and that some persons get the disease from certain drugs to which they are peculiarly sensitive. Vaughan and Pipes<sup>9</sup> reported that certain allergic patients have stomach upsets following contact with the allergic substance and Gar<sup>10</sup> pointed out that allergy may be the cause of unexplained fever which persists in some individuals for no apparent cause. The symptoms mentioned by these workers and other closely related ones that she had suggest that she was definitely allergic. Such symptoms were the purpura which ap-

peared suddenly, the menorrhagia and metrorrhagia which probably followed intra-abdominal bruising, increased capillary fragility, episodes of unexplainable temperature rises, unexplainable vomiting, headaches, unexplainable episodes of leucocytosis and liver enlargement and tenderness.

When all of the findings are assembled it certainly appears that we have (1) A young girl, poorly endowed constitutionally (unstable), with emotional lability, who is made more so by the debilitation following rheumatic fever. (2) Marked evidence of drug sensitivity and protein sensitivity. (3) Physical and laboratory evidence of allergy.

The problem which brought the patient to the hospital was an active psychotic state. This state it so happened, was the reaction of the total personality of the individual to caffeine which constituted a part of her total environment. This part environment constituted a substance to which she responded in an allergic manner, and this response manifested itself more strongly as a psychosis than in any other manner. When the incompatible environment caffeine was removed she immediately returned to her former normal state. Such an allergic basis for a psychosis is a bit unusual, but in this case the facts certainly warrant such conclusions.

It was extremely unfortunate that this girl was diagnosed a psychoneurotic, for it was unquestionably this diagnosis which led to the treatment which in turn produced the actual psychosis. Such an instance is probably not an isolated one. The diagnoses, psychoneurosis, neurosis, hysteria and such, are labels which come freely and easily to the minds of medical men when they have a diagnostic problem which baffles them. This group of diagnoses might well be labeled the "waste basket of medicine," for it is certainly true that the future physician is, in all but a very few medical schools, inadequately or not at all instructed in the field of psychoneuroses, that the practicing physician, as a rule, not knowing the intricate workings of the psychoneurotic mind, does not attempt to remedy that deficiency and that when ordinary diagnostic measures fail, an acute

emergency not arising, the physician, being pushed for time, is very prone to take the easiest way out—a diagnosis must be made so the patient becomes psychoneurotic. Thus it is highly probable that in the great population already labeled psychoneurotic there are many, who, if investigated carefully from a medical point of view, would be able to be correctly diagnosed. Such correct diagnosis having been made, it is possible that, as in our case, some simple form of treatment would relieve what had apparently been a malignant psychoneurosis.

#### SUMMARY

A case of caffeine intoxication has been presented. It has been pointed out that this intoxication with its resulting complications was probably explainable upon an allergic basis.

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REVERSION OF CARDIAC ENLARGEMENT IN A FOUR YEAR  
OLD CHILD FOLLOWING TREATMENT FOR AVITAMINOSIS

BY LOUIS RABINOWITZ M D \* AND EDWARD J ROGERS M D \*

**I**N children with organic heart disease, cardiac enlargement is almost always permanent and irreversible. But there are several conditions where heart enlargement may recede following proper treatment.

Walker in a recent paper mentions arteriovenous aneurysm, beriberi and mixedema as three conditions wherein the ensuing cardiac enlargement may disappear after treatment of the respective disease process. To these a correspondent added that the heart enlargement secondary to pulmonary tuberculosis receded following intensive diuretic therapy (Rosenblatt).

The case presented is that of a four year old male child with chronic avitaminosis, and cardiac enlargement which disappeared following adequate treatment of the avitaminosis.

## CASE REPORT

R. H. a four year old white male child entered the Caverly Preventorium for Children October 19 1935 with a chief complaint as stated by the informant his mother of anemia prostration and fever for several months.

The patient was born in Vermont September 14 1931 at the eighth month of gestation and weighed nine pounds. At the time of his birth his mother was 33 years old and his father 36 years old this boy being their fifth child. The mother nursed the boy for the first two weeks when he was placed on cow's milk and white Karo. While the baby was not sick he did not appear strong.

At about ten months of age he suddenly began screaming when his limbs were handled. The very approach of his parents to his bedside elicited outcries. The family physician examined the child at this time and could find nothing the matter. About three weeks later the child again began to scream whenever he was touched. This time the family called a chiropractor who gave the child adjustments. These "worked." The large black circles under the child's eyes disappeared. No more spells occurred until the winter of 1935 when the screaming again appeared. The chiropractor again adjusted the child and improvement was noted.

The child was late in sitting and standing. He did not begin to walk until May 1935 about three years and nine months after birth. He never ate well and it was not until the summer of 1935 that he had any solid food which consisted of some bread jelly and cake—the only other food or medication being milk and Karo syrup. The child had had measles chickenpox and whooping cough.

Physical examination at the Preventorium disclosed a four year old white male child thirty inches long and weighing twenty seven pounds. He was mildly dyspneic and hoarse. His head was abnormally shaped with enlarged temporal veins. The facies was peculiar somewhat senile. The skin was dry scaly and of a markedly lemon tint. Pe-

techial spots were noted at the elbow bends and ecchymotic areas along the lower legs. Small orbital hemorrhages were present. The breath was foul and there was evidence of delayed dentition as well as irregular enamel formation. The gums were deep bluish purple in color and spongy about the upper central incisors. They bled easily with some tissue slough. The tongue was coated and the tonsils hypertrophied.

The pulse was rapid small and irregular with the presence of a transitory gallop rhythm. A precordial thrill was present. The area of cardiac dullness was markedly extended to the left axilla. Loud blowing systolic and diastolic murmurs were heard over the mitral area transmitted to the axilla and back and entirely obliterating the heart sounds. A blowing diastolic murmur was noted in the pulmonic area transmitted down the sternum. The aortic first sound was louder than the aortic second sound while the first pulmonic sound was softer than the second pulmonic sound.

There was general enlargement of the abdomen and the spleen could be palpated.

Pain and tenderness were noted in all joints and increased on motion. There were bilateral redness and swelling of the ankles with edema of the feet. The muscles were small and flabby. There seemed to be some swelling and tenderness about the lower ends of the diaphysis of the tibia and femur of both legs. When an attempt was made to stand the boy on his feet pseudoparalysis seemed to be present. There was epiphyseal enlargement of all the long bones with a tibial tendency to curvature.

Clinical observation later disclosed a temperature rise to 102 to 104 degrees F. rectal in the afternoon. General weakness and constipation were marked. The child was very restless at night and sweating was very profuse and general being most marked at night and of a sour odor.

Examination of the blood disclosed a hemoglobin of 25 per cent red blood cells of 1 950 000 and a white blood count of 5 500 differentiated as eosinophiles 0.5 per cent basophiles 1.5 per cent stab forms 3 per cent segmented forms 46.5 per cent lymphocytes 45 per cent and monocytes 3.5 per cent. The coagulation time was increased. The red cells showed extreme achromia anisocytosis and poikilocytosis. The urine was essentially negative except for a high concentration of urates.

X-ray examination of the chest showed a markedly enlarged heart shadow (figure 1). The long bones disclosed a diminution of the transverse band of the distal end of the metaphyses with decidedly broadened and irregular frayed surfaces. There were fluffy zones of calcification at the junction of the epiphyses and the shafts with smooth ground glass appearance of the shaft proper.

The child was placed on bed rest and a varied diet was offered him high in vitamin C accompanied by liver concentrate iron and viosterol.

Following this treatment, the temperature gradually dropped to normal the abnormal heart sounds and the cardiac dullness receded the skin color lost the green yellow tint joint tenderness swelling and pain disappeared and the child began to walk.

About three weeks after entry the hemoglobin rose to 55 per cent and the r. b. c. to 3 250 000. In February 1936 five months later the hemoglobin was 90 per cent and the r. b. c. 4 900 000.

The x-ray examination of the chest at this time

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showed the recession of the cardiac shadow to within normal limits (figure 2)

At the time of discharge, May, 1936, the child was in good health with no cardiac symptoms or signs

#### DISCUSSION

This child had been inadequately fed all his life. He had, besides the signs of heart disease, the symptoms and signs of scurvy, rickets, and possibly beriberi.

Following four months of proper feeding with adequate amounts of vitamins B, C, and D, all the symptoms and signs of his avitaminosis disappeared as well as the cardiac signs, and re-

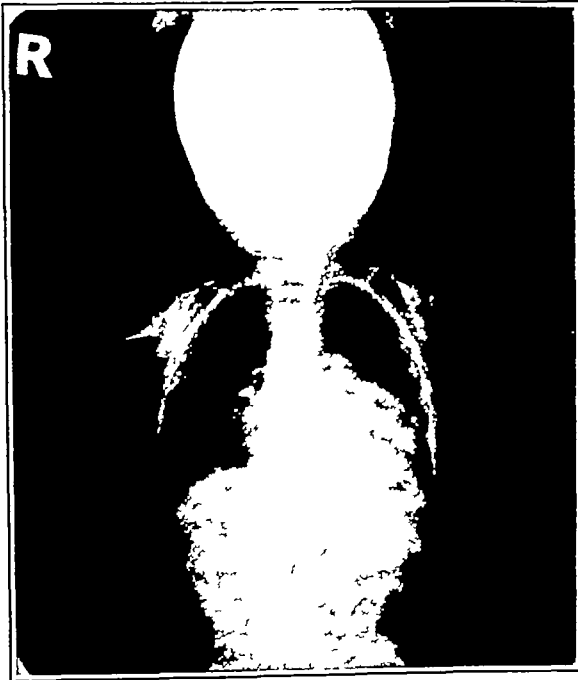


FIGURE 1 Roentgenogram of chest (6 feet) of four year old male child on inspiration. Cardiac shadow enlarged

version to within average limits of the heart size took place

There can be, consequently, very little doubt that the cardiac enlargement, in this case, was caused by the avitaminosis, and that treatment of the latter condition resulted in the disappearance of the cardiac enlargement noted

The close relationship between cardiac involvement and nutrition has been fully discussed by Wenckebach. Nutritional disease can result in heart disease with its concomitant feeble circulation, palpitation, edematous extremities, and heart failure resulting in death. The left ventricle may enlarge first, followed later by the right ventricle. Temperature may be noted, accompanied by cyanosis and dyspnea.

Vitamin B lack in the form of beriberi may result in cardiac hypertrophy as a secondary manifestation of celiac disease (Lehndorff and

Mautner). Even the mildest cases of beriberi may show perceptible enlargement in the roentgenogram (Aalsmeer and Wenckebach). Kugel and Stoloff noted myocardial degeneration and cardiac hypertrophy in this type of vitamin lack.

Erdheim noted that the right heart was hypertrophied in cases of scurvy in children, especially in the older children. He suggested that the subperiosteal changes in the bony cage of the thorax might inhibit respiration, and thus lead to a right heart hypertrophy and dilatation. In cases of vitamin C lack, right ventricle enlargement has been noted by Hess. The same author later suggested that polycythemia might be present in this deficiency disease. In the majority of his cases Aron noted a reduction of hemoglobin and red blood cells. Abt has very recently written that the anemia of infantile scurvy is usually chlorotic.

Pfaundler noted cardiac muscle myopathy in cases of rickets. This vitamin D deficiency may show a hypertrophy of the right side of the heart.

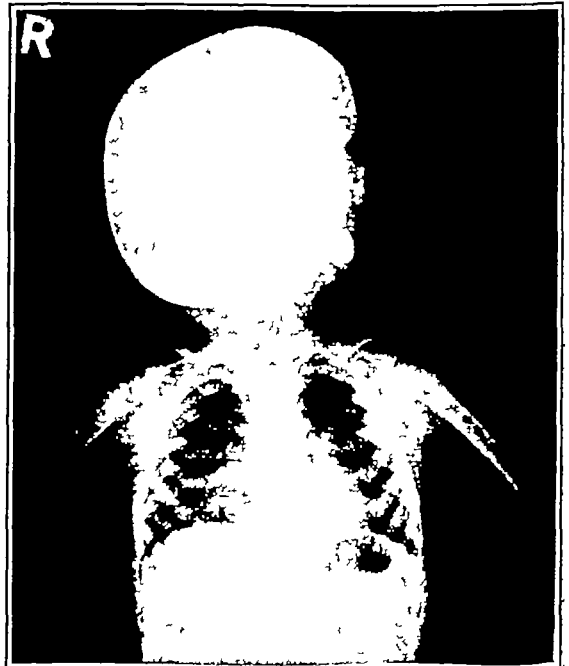


FIGURE 2 Roentgenogram of chest (6 feet) of same child 3 1/2 months later. Cardiac shadow within normal limits

which may last for two years and then return to normal size (Finkelstein). The cardiac enlargement in the case presented here began to recede within a few weeks after treatment had been started. Meixner noted that the left ventricle was enlarged and that the endocardium was thickened in cases of rickets.

Very interesting and suggestive experimental work has been produced by Rinehart, Connor, and Mettler, and verified by Stimson, Hedley,

and Rose who induced rheumatic endocarditis in scorbutic guinea pigs by injecting them with a streptococcal strain of organisms with a resulting pathology very similar to the rheumatic endocarditis in man

## SUMMARY

(1) There is presented a case of chronic avitaminosis in a four year old child exhibiting cardiac enlargement

(2) The cardiac enlargement, and symptoms and signs of heart disease, disappeared after four months of adequate feeding

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## A STUDY OF FOUR HUNDRED JUVENILE DELINQUENTS (Statistical Report)

BY WINTHROP B OSGOOD, M D \* AND CARL E TRAPP, M D \*

THE Boston State Hospital has one of seven teen clinics in Massachusetts engaged in the examination of juvenile delinquents prior to commitment Massachusetts is the second state to establish this unique juvenile law, preceded only by Virginia

The following report represents four years' work in the study of juvenile delinquents, chiefly from the psychiatric standpoint The juveniles examined are from the district courts of Boston They comprise a selected group the members of which have, for various reasons, been considered for commitment and are, therefore, subject to the examinations listed below

This study is under the supervision of the Department of Mental Diseases of Massachusetts in accordance with the provisions of Chapter 215, Acts of 1931 The purpose of the law is to give the presiding justice of the juvenile session information regarding the physical, mental and social assets and liabilities of the child adjudged delinquent for his guidance in disposition and, in the event of commitment, for the information of the superintendent of the institution, to which commitment is made Notification is received from the probation officer of each juvenile court or session Reports are made on a prescribed form and are sent to the court in each case

The examination comprises chiefly a complete history, including the previous delinquent record The school record is examined and an in-

telligence test done (Binet-Simon, Stanford Revision) † A physical and a psychiatric examination follow The present study involves 400 juvenile delinquents examined during the period, 1932 to 1936 Of this number 328 were boys and 72 were girls Their ages varied from eight to eighteen years

## STATISTICAL REPORT OF STUDY

Table 1 reveals the number of delinquents by age and sex This table has also been graphed (chart 1) It is apparent that in both sexes

TABLE 1

## AGE AND SEX OF DELINQUENTS

Age	8	9	10	11	12	13	14	15	16	17	18	Years
Number Boys	2	4	8	17	27	28	55	70	102	12	1	
Number Girls	0	1	1	0	3	8	14	22	22	3	0	

the greatest number of delinquents who are brought before the court appear between the ages of fourteen and sixteen years In the younger age groups the number of girls is much less than that of the boys, this may be due to the fact that, since the chief offenses of the girls are of a sexual nature they tend to occur after the onset of puberty This is in agreement with the findings of Healy and Bronner<sup>1</sup> who, from a study of 117 female offenders determined that 94 per cent were sex offenders A study of our table 4 will reveal that the great-

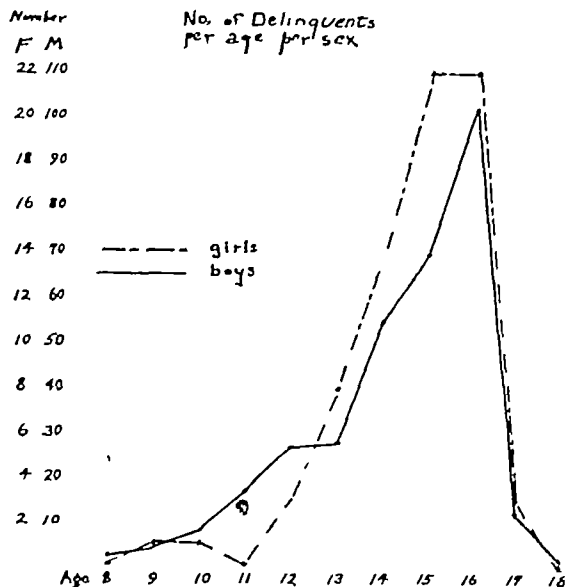
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†We are indebted to Mrs Edith James for her work in determining the intelligence ratings of these delinquents

est number of offenses among girls were sex offenses or stubbornness.

The conception that the average juvenile

(CHART 1)

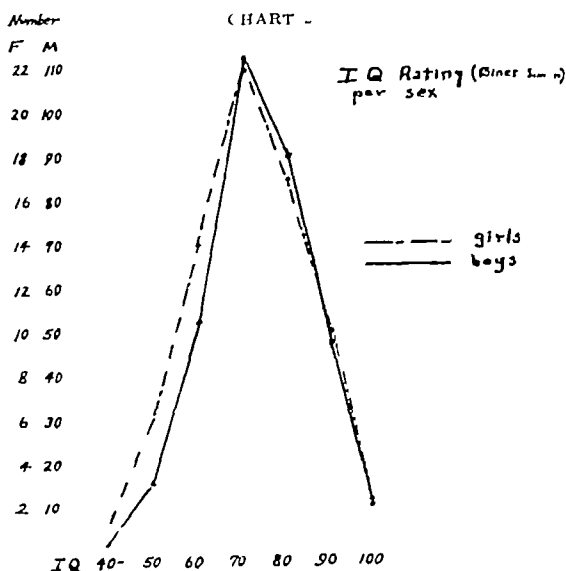


delinquent is of borderline intelligence has been confirmed in this study (Table 2 and chart 2).

TABLE 2

INTELLIGENCE RATINGS

I Q	40	50	60	70	80	90	100	110
Number Boys	1	15	52	112	90	47	11	
Number Girls	1	6	14	22	17	10	2	



From this table can be gathered the fact that 61 per cent of the boys and 54 per cent of the girls were classified in this group. Those of

normal intelligence made up 18 per cent of the boys and 17 per cent of the girls. There were 21 per cent males and 29 per cent females who were considered to be feeble-minded. The close correlation between the intelligence of the girls and that of the boys is remarkable. This is most clearly seen in chart 2.

The psychiatric examination, which is probably the most important feature, revealed that 6 boys and 2 girls were definitely psychotic. Some had been inmates previously in state hospitals or had been examined in psychiatric clinics. The mental symptoms noted in these 8 psychotic delinquents included hallucinations and delusions, abnormal emotional states and so forth. Eight boys and 6 girls were classified as of psychopathic personality. As in the cases of those who were psychotic, their offenses were serious in nature. Two boys were found to be epileptic. The results of this study are tabulated in table 3. The tabulation includes the sex, age, present offense, total number of offenses and intelligence quotient rating.

A study was then made of the total offenses, past and present, arranged by sex. These results can be found in table 4.

Among the boys, larceny was the most frequent offense. This included thievery of money and groceries and larceny of a more serious nature, such as from department stores and the like. Breaking and entering, where the delinquent had actually broken into a store or home for purposes probably of larceny, falls next in line. The unlawful use of larceny of an automobile has received a special classification and shows 147 offenses. Larceny of automobile accessories has been grouped under "auto offenses." There was only 1 charge of arson against a boy. Four boys carried weapons. Of actual assault and battery there were only 10 charges.

Among the girls it is apparent that the most frequent offenses were sex misbehavior, stubbornness and truancy. Running away from home was also frequent.

In line with this particular feature of the study it was decided to group the total number of individual offenses by age and sex. This can be seen below in table 5. At a glance it can be noted again that the greatest number of offenses occurred between the ages of fourteen and sixteen and as might be expected, the greatest number of repetitions of offense can be noted at these ages. Thus for example, according to the chart, at the age of sixteen among the boys, 15 had a charge of only 1 offense, 22 had already committed 2 offenses and 23 had committed 3 offenses. One delinquent had committed 8 offenses. Among the girls a similar charting can be seen. Twelve girls at the age of sixteen had only 1 offense each, 6 girls had 2 offenses and 4 girls had 3 offenses. The offenses

*Psychotic*

### Psychopathic Personality

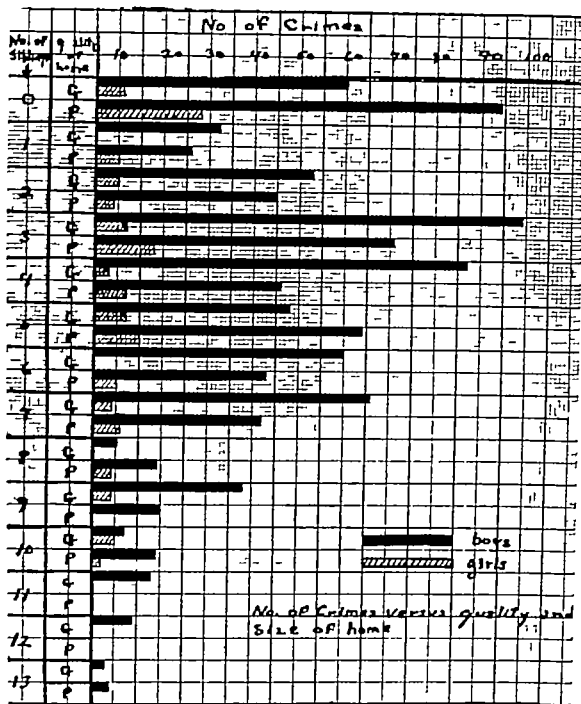
*Epileptic*

Total No of Offenses	Boys									Girls				
	1	2	3	4	5	6	7	8	9	1	2	3	4	5
Age														
8	1	1												
9	1	1	1	1						1				
10	2	3	2		1					1				
11	7	4	2	2	1	2								
12	7	8	6	2	2	1				1	1	1		
13	7	7	7	6	2	1				2	3	2		
14	14	24	13	3	2		1			8	5	1		
15	10	24	18	13	4	3	1			12	6	1	1	1
16	15	22	23	19	10	3	5	1		12	6	4		
17	1	4	4	2					1	2		1		
18	1													

listed on this chart, whether the first or eighth, had all been brought to the notice of the court

The final feature of our study was to examine the home, size of family, court records of other members of the family and so forth. This was difficult as records were scanty and much of the information came from the delinquents themselves. An examination of other members of the family in regard to court records revealed the following: Of the 328 boys, 59 had siblings with court records, 13 had fathers with court records and 3 had mothers with court records, of the 72 girls, 8 had siblings with court records, 3 had fathers with court records, and 1

CHART 3



had a mother with a court record. As a general rule among the siblings there were minor charges of larceny and the like. Among fathers the charges varied from larceny to attempted murder. The mothers were usually arraigned as a result of sexual offenses.

A study was then made of the number of offenses as compared with the number of siblings in the family and also as to the quality of the home. This has been graphed on chart 3. Under the heading listed as no siblings, the family history was uncertain and it was difficult to determine the number of siblings, so that this actually is a miscellaneous group.

Homes have been listed on the graph as good, signified by "G," and poor, signified by "P." A good home meant that both parents were living, that financial circumstances were sufficient for the care of the family, that aid was unnecessary and that there were no criminal records in the home in other members of the family. Poor homes were considered as such if the mother or father was delinquent, had a court record or in other ways was incapable of taking care of the family or if older siblings had court records and were influencing the delinquent under consideration. It is apparent that of fences in the delinquent are little influenced by the quality of the home, according to the standards mentioned above and that in many cases delinquency was greater in homes of good quality. These figures, however, can be subjected to considerable criticism, inasmuch as thorough studies of the home were difficult to make.

#### SUMMARY AND CONCLUSIONS

A statistical report of the study of 400 juvenile delinquents is presented, comprising four years' work. The report has included the age and sex of the delinquents, their intelligence ratings by sex, the results of psychiatric examinations, a consideration of the total number of offenses arranged by kind and by sex, a consideration of the total number of individual offenses arranged by age and sex and the condition of the home. It is apparent from this study that:

1 The average I Q (Binet-Simon) of the delinquents studied was of borderline intelligence rating. Twenty-one per cent of the boys of the whole group studied and 29 per cent of girls were feeble-minded.

2 Psychiatric studies revealed that 8 delinquents were definitely psychotic, 14 were classified as psychopathic personalities, and 2 were epileptic.

3 Of the offenses studied, the boys chiefly committed larceny and unlawful use or larceny of an automobile, whereas the girls had charges chiefly of sex misbehavior, and running away from home and of stubbornness. Four boys, however, carried weapons, and the most serious offense was that of arson.

4 A study of the quality of the home and the number of offenses committed shows no correlation, inasmuch as there are the same number of offenses in good and bad homes.

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CASE RECORDS  
of the  
MASSACHUSETTS GENERAL  
HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT, M.D

TRACY B MALLORY, M.D, *Editor*

CASE 22401

PRESENTATION OF CASE

A twenty-two year old white man was admitted complaining of drowsiness and profuse sweating

Two months before coming to the hospital the patient gradually developed ready fatigue, dyspnea on exertion, drowsiness, lethargy and dizziness. Previous to this time he had been perfectly well and had carried on hard physical work. At the onset of his illness he had a slight chest cough and complained on several occasions of severe cramp-like pain in the midepigastrium which had no relation to meals. Dyspnea became more marked and five weeks before entry he developed painful swelling of the ankle which lasted for about one week. At this time he went to bed and remained there until his admission. Despite the bed rest he continued to become weaker and his weight decreased from 159 to 130 pounds. He had frequent drenching sweats and felt very drowsy. Occasionally he had a shaking chill and on two occasions moderately severe nosebleeds.

For two weeks before entry he had frequent paroxysms of dyspnea while in bed, each of which lasted about ten to fifteen minutes and was associated with marked palpitation. For two days he had cough, alternating chilly and hot sensations, and a return of the cramping epigastric pain. He vomited several times. On the day of entry he became quite irritable and developed sharp pain in the right shoulder.

The patient had had acute rheumatic fever at the age of eight years, and this was followed by a "leaky heart valve."

Physical examination showed a well-developed but poorly nourished young man who appeared seriously ill. He perspired profusely and appeared to be quite restless. A small tender red area was noted in the metatarso-phalangeal pad of the right index finger. Petechiae were seen in the conjunctiva of the lower right eyelid and a few others were noted in the buccal mucous membrane. The skin and mucous membranes showed considerable pallor. The lungs were clear. The heart was slightly enlarged downward and to the left, and the apex beat

was rapid and forceful. An occasional extrasystole was heard and there was a loud systolic murmur with a suggestion of a presystolic element heard at the mitral area. Beneath the sternum at the level of the third interspace a faint middiastolic whist was heard. Gallop rhythm was noted and the second pulmonic sound was palpable, loud, and ringing in character. The blood pressure was 120/70. The liver edge extended four fingerbreadths beneath the costal margin and was soft and tender. The spleen descended to the costal margin with inspiration.

The temperature was 101°, the pulse 120. The respirations were 50.

Examination of the urine showed a specific gravity of 1.020, with a slight trace of albumin. The sediment was negative. The blood showed a red cell count of 3,140,000, with a hemoglobin of 45 per cent. The white cell count was 25,900, 80 per cent polymorphonuclears and it rose in several hours to 54,600. The vomitus gave a negative reaction to the guaiac test.

The patient suddenly died about twelve hours after entry.

DIFFERENTIAL DIAGNOSIS

DR WILLIAM B BREED. Unless there is some very obscure and unusual condition here I think we can at once arrive at one diagnosis. If they had had time to take a blood culture we would expect to get back a positive report of *Streptococcus viridans*. It is a perfectly typical story of subacute bacterial endocarditis superimposed on rheumatic heart disease. There are not very many points that we need to bring up in differential diagnosis. The sweats and fever make us think, before you go down farther in the history, of tuberculosis, lymphoma, and various other conditions. Of course, he may have one of these diseases but there is no particular point in putting them down and making a big list of differential diagnoses in this case.

There are two or three interesting points. If this man has mitral stenosis, which I think is somewhat doubtful on the evidence produced, that is an unusual condition in subacute bacterial endocarditis. Clear cut stenosis of the mitral valve is not a common finding in the presence of *Streptococcus viridans* infection.

Are there any comments you would like to make on the history up to the point of the physical examination which would throw any light on a reasonable diagnosis other than subacute bacterial endocarditis? Of course, we can consider perinephric abscess, subdiaphragmatic abscess, and pyelitis, but there is no particular reason for going into these conditions when there is a perfectly good history of epigastric pain, cramps, with fever, sweating, chills, nosebleeds, petechiae, and so forth.

A PHYSICIAN Would you attempt to differentiate subacute and acute, that is hemolytic streptococcus, bacterial endocarditis?

DR BREED Acute hemolytic streptococcus endocarditis is a rare complication of rheumatic heart disease. I would be more willing to explain the whole picture on plain rheumatic fever rather than acute hemolytic streptococcus infection. We are always trying to decide in these cases whether there is subacute bacterial endocarditis or rheumatic heart disease with an acute flare-up of rheumatic fever. This can perfectly well be rheumatic fever alone.

A PHYSICIAN Without joint symptoms?

DR BREED Yes, patients, particularly children, can die with acute rheumatic fever without having any joint symptoms at all almost as often as they die with joint involvement. To be sure, he is a young adult but I must say this is pretty rapid progress for subacute endocarditis. It usually runs longer. I am willing to introduce the simple diagnosis of rheumatic fever on this patient. Neither diagnosis can be proved on the clinical evidence. He was in the hospital only a few hours.

A PHYSICIAN Is not fourteen years a long interval without any intervening symptoms?

DR BREED It is a little long but certainly not uncommon.

A PHYSICIAN The question I meant to ask, Dr. Breed, was whether you might not elect to disregard the rheumatic side of the picture and the past history and assume that he had acute bacterial endocarditis.

DR BREED That is perfectly fair but I do not see how you can quite neglect rheumatic fever in the past, and known rheumatic heart disease. The superimposition of hemolytic streptococcus infection on old rheumatic heart disease is not very common, not so common as that of *Streptococcus viridans*, but I must admit the episode is pretty acute and short for the latter.

A PHYSICIAN He had rather severe sepsis for a period of a couple of months, fever, chills, sweats, and so forth.

DR BREED It is perfectly plain to see that the consensus of opinion is beginning to point toward acute endocarditis rather than so-called subacute bacterial endocarditis.

A PHYSICIAN How do you make a diagnosis of acute rheumatic fever without joint symptoms?

DR BREED In children you make it on a story of the patient's not doing well generally, not gaining weight, upon lassitude, low grade fever, slight leukocytosis, possibly a prolongation of the P-R interval by electrocardiogram, juxta articular nodules, and by ruling out any other infection. You will see plenty of patients at the Good Samaritan Hospital with subacute rheumatic fever and rheumatic heart disease

who never had any joint symptoms at all. It is the common cold that practically always precedes the rheumatic episode in children. If we can eliminate the common cold we can decrease the incidence of rheumatic fever exacerbations.

A PHYSICIAN He was having showers of emboli. Would that speak for bacterial endocarditis rather than rheumatic fever?

DR BREED Yes, although one may have petechiae in rheumatic fever. He has bacterial endocarditis, I believe. I just brought up the question that it might be considered straight rheumatism because straight rheumatic infection is very severe and is often acutely fatal. But I think we all agree that he has bacterial endocarditis. The question is, what is the bacterium?

A PHYSICIAN Is it not rather prolonged for acute?

DR BREED No, as a matter of fact now that we talk about it more, I am beginning to think it has too short a duration for subacute bacterial endocarditis. He may have an influenzal endocarditis. We have had a number of cases here of influenzal endocarditis with this same picture. I think we have to summarize it this way, that he probably has bacterial endocarditis and if we had him longer we would take blood cultures and perhaps make the diagnosis definite before he died. I am beginning to feel that this is more of an acute affair and that it may be due to hemolytic streptococcus or something other than *viridans*.

Let us go over the physical examination again. The suggestion of a presystolic mitral murmur means nothing in regard to a definite diagnosis of mitral stenosis.

A PHYSICIAN You would expect a certain amount of stenosis?

DR BREED Yes, after fourteen years of the disease.

The gallop rhythm here was either due to this presystolic or late diastolic murmur, which I prefer to call it, or it indicates rather extreme myocardial damage.

The fact that the pulmonic second sound was ringing in character would lead to the suggestion that he had mitral stenosis. I think we shall find a small amount of stenosis, certainly not much. On the other hand, the diagnosis of mitral stenosis has been made on a number of children here and at the House of the Good Samaritan by different physicians on the same patient after long periods of observation and at postmortem examination the mitral valve showed no stenosis. So we are pretty chary about the diagnosis unless the signs are clear cut. However, I think we might just as well be brave and say that he has mild stenosis.

There is no indication of any aortic regurgitation here so far as the blood pressure goes, although there is a "whuff" in the third in

terspace It does not say whether it is right or left but it is middiastolic and therefore cannot be put into the aortic group Therefore I will say the aortic valve is clear as far as any organic condition goes

The large tender liver may not be due to congestive failure, it may be due to acute infection and toxemia If he had subacute bacterial endocarditis of the viridans type he ought to have a large spleen This is merely just felt, and so I think we shall have to lean more toward acute streptococcus infection—on the basis of the history together with the physical examination The question is what did he die of? It does not say under what conditions he died He just died suddenly

#### CLINICAL DIAGNOSIS

Subacute bacterial endocarditis

#### DR WILLIAM B BREED'S DIAGNOSES

Bacterial endocarditis, ? organism  
Rheumatic heart disease with mitral stenosis

#### ANATOMIC DIAGNOSES

Subacute bacterial endocarditis of the mitral valve with rupture of the chordae tendineae

Cardiac hypertrophy rheumatic type  
Chronic passive congestion of the liver  
Splenic infarction

#### PATHOLOGIC DISCUSSION

DR BENJAMIN CASTLEMAN The heart weighed almost 600 grams and showed hypertrophy of both the left and right ventricles and marked dilatation of both auricles and the left ventricle The right ventricle was about 8 mm in thickness All the valves were negative except the mitral, which although not very stenotic showed evidence of old infection in that the chordae tendineae were thickened Along the edge, along the line of closure and also extending down the chordae tendineae and up onto the auricular wall were pinkish red and gray granular thrombi characteristic of a subacute bacterial endocarditis The rapidity of his course may have been connected with a rupture of the chordae tendineae of the posterior leaflet due to the bacterial endocarditis

He also had an infarct of the spleen, although the spleen itself was not very large weighing only 370 grams The liver was very large over 3,000 grams, and showed congestion and well marked central necrosis The kidney, as is usually expected in this condition showed an embolic nephritis Our postmortem blood culture was unfortunately contaminated but the endocarditis was certainly entirely typical of the so called bacterial type produced by the streptococcus viridans

#### CASE 22402

#### PRESENTATION OF CASE

A forty-seven year old poultryman was admitted complaining of ulceration of the neck, left elbow, left axilla and right antecubital fossa

Two months before this entry the patient had entered the hospital for a period of one month, during which time these ulcerations were treated with simple boric acid and zinc peroxide dressings They had occurred spontaneously six months previously, had remained refractory to treatment and were quite painful Following his entry they improved very slowly but never subsided completely No initiating trauma or causative factor could be determined Cultures of the ulcers during this previous admission showed staphylococci bacillus coli and anaerobic streptococci Biopsies were negative for malignancy and tuberculosis Following his discharge the patient faithfully continued his treatment at home and remained quite comfortable A week prior to readmission he changed the brand of boric acid used in his dressings however and shortly afterward the edges of the ulcerations became reddened and extremely tender The ulcer on the right arm began to ache considerably and for two days there were shooting pains running up the arm

Twenty-seven years before entry the patient had a furuncle in the left axilla which was excised but continued to drain for eight months Fifteen years later the left forearm was amputated three inches below the elbow because of a severe hand infection following a scratch

Physical examination showed a well-developed and nourished man with painful ulcers situated on the nape of the neck in the left axilla, two in the left forearm stump and one at the right elbow All showed irregular slightly inflamed, undermined edges with considerable induration and raised unhealthy looking central granulation Small firm, discrete, nontender cervical and axillary nodes were palpable The heart and lungs were normal and the remainder of the examination was negative

The temperature was 100° the pulse 90 The respirations were 20

Examination of the urine was negative The blood showed a red cell count of 3,700,000, with a hemoglobin of 90 per cent The white cell count was 9,700 A Hinton test was negative On different occasions hemolytic streptococci were cultured both aerobically and anaerobically from the various wounds

The patient continued to run a low grade fever ranging from 98° to 101° and although the ulcers showed some evidence of improvement the patient was considerably depressed A determination of the patient's phagocytic index for the cultured streptococci proved to be quite



low Attempts to obtain immune donors were finally successful and an immunotransfusion was given This resulted in a well-defined increase of the phagocytic index but at the end of about two months the skin ulcerations again began to become painful and angry looking Gradually his condition became worse and after about three and a half months the temperature showed a consistent daily rise to  $102^{\circ}$  The white cell count at this time was 18,000 A pulse irregularity was shown by electrocardiogram to be resultant upon ventricular extrasystoles No other abnormality was noted The axillary ulcer extended beneath the pectoralis major and the pain became severe At the end of the fourth hospital month debridement of the ulcers was performed and Dakinization instituted Ten days later he was given a transfusion during which he had a severe chill and his temperature rose to  $104^{\circ}$  an hour later At this time he began to vomit and complained of numbness in both legs and shortly afterward developed a flaccid paralysis with loss of all sensation in both lower extremities Both legs were pallid and cool and there was no pulsation in the femoral, popliteal, or dorsalis pedis arteries Suction boots were promptly applied to both legs and seven hours later the right leg was somewhat warmer and pinker than the left Incontinence of urine and feces ensued and the vomiting continued Two days after the acute episode the stump of the left arm became dark and cyanotic and an ulceration developed upon the lower back The left lower limb became black and blistered up to the hip but, although pulsation, sensation, and movement continued to be lacking on the right, no other color changes became evident The temperature rose to  $103^{\circ}$  and numerous ulcerations appeared in the mouth The patient became progressively weaker and died six months after entry, two weeks after the onset of the acute episode

#### DIFFERENTIAL DIAGNOSIS

DR LELAND S MCKITTRICK We can probably dispose of the first two or three paragraphs of this history very briefly I think they form the background for what is to follow He is obviously one of those people who have a markedly lowered resistance to pyogenic infection I say that because of the eight months it took to heal up the furuncle and because of his losing an arm for a bad infection of the hand His more recent infection I assume falls into that group of cases that Meleney in New York has done so much work on, a slow progressing infection due to an anaerobic streptococcus responding to wide excision, and more recently to the use of zinc peroxide dressings, because of the oxygen that is liberated That represents the background of this patient and only

in that way does it have to do with what we are concerned with at the present time

The next thing in his long chronic past history was his immunotransfusion with apparently some relief and then a recurrence of more rapid progression and high fever, then the pulse irregularity which the electrocardiogram showed to be due to ventricular extrasystoles I mention that now because I do not believe it to be of much significance and doubt that we need pay much attention to it The striking thing that after a transfusion he had a chill, a temperature of  $104^{\circ}$ , numbness and paresis of both legs, absent pulsations from the groins down, loss or incontinence of feces and urine, vomiting, and extensive gangrene of one leg extending up to the hip, which is an extraordinarily high level for gangrene to reach on one side with absolutely no gangrene on the other side. The chill and temperature of  $104^{\circ}$  carry me back a little way to the times when we used to transfuse for pernicious anemia and transfuse some of the very late or sick pernicious anemias, and have them have a severe chill and high fever, when the blood to all intents and purposes was compatible I do not think this is more than a severe reaction in a debilitated and sick patient I do not believe it means an incompatible blood I do not know just what the association is to the major episode which followed. As I interpret the early signs of numbness, absent pulsation, and cold feet, it seems that he must have had an occlusion of his aorta supposedly at the bifurcation That is a perfectly classical picture with not so much pain as they ordinarily have, with loss of sensation, flaccid paralysis, and absent pulsations I do not see how one can draw any other conclusion than that The picture from this point on becomes an extraordinary one It seems to me it is difficult to visualize how a sudden embolic occlusion of the aorta, at its bifurcation or possibly above, could result in such high and extensive gangrene on one side and the absence of gangrene on the other side I think one could visualize a dissecting aneurysm that exerts pressure on one side so as to occlude it completely, but permits a little blood to trickle through on the other side There is nothing in the history to suggest this diagnosis, however, and I should be quite willing to drop it I think it is possible that the application of suction boots may have altered the picture It is conceivable to me that he may have been benefited on the right side from the application of the suction boots, whereas on the left side it may have done harm We use a very tight, constricting band going around the leg in order to maintain an airtight compartment in the boot and all of us have felt that there was some danger from the constriction of that band, and it is conceivable to me that this picture is obscured by a cer-

tain amount of benefit having been derived from the application on the one side and harm from the application on the other side. Even accepting this possibility it remains an extraordinary picture. The persistence of incontinence of feces and urine and the persistence of his paralysis on the right side lead me to believe that the occlusion extends above the bifurcation of the aorta. The fact that he had urine to pass makes me feel that unless it was a very terminal thing that the occlusion does not extend above the level of the renal arteries, because if they were occluded anuria would result. Therefore I believe this man has occlusion of the aorta possibly extending as high as the renal arteries but not involving them. I believe that this is a little more apt to be due to a thrombus than an embolus because I do not quite visualize just where so big an embolus is coming from in a man who had no more to show in his heart than extrasystoles.

#### CLINICAL DISCUSSION

DR EDWARD D. CHURCHILL. Dr McKittrick has covered the circulatory disorder admirably. I shall refer very briefly to the problem presented in the surgical care of this type of ulcer. It was a typical anaerobic or microaerophilic hemolytic streptococcus infection. The best treatment lies in dressings of zinc peroxide, a method developed quite recently by Dr Frank Meleney of the Presbyterian Hospital. In addition, a debridement of the margins is performed to enable the zinc peroxide to come in contact with the advancing edge of the infection. The suffering of these patients is terrific. I have just looked over the daily notes and will read two or three of them. "Dressings burn a great deal." "Improvement. Patient depressed, very nervous during dressing." "Nervous, crying a little hysterical." "Very depressed to-night. Mention made that he would be in the hospital another five or six months."

The actual debridement of the ulcer was postponed because of the very low resistance this patient showed to the organism. Our experience with immunotransfusion in treatment of infections due to this particular type of organism and lesion has not been great, nothing comparable to our experience with immunotransfusion in the pathogenic varieties of the hemolytic streptococcus, where we have had good results. Here is a note, "His wife and twelve professional donors were tested in an effort to find a donor, two days later ten more, two days later twenty-five donors studied, still unsuccessful in finding an immune." A few days later ten more were tried out of which one was accepted as an immune donor. More notes about the pains. "Perhaps some improvement but slow." "Neurosurgical consultants being solicited for possibility of relief of pain." They were not

able to offer it. "Considerable pain tonight." "Patient would like irrigations spaced farther apart because of such great pain in changing." A patient in the hospital month after month with daily, painful dressings to look forward to is a terrific problem. We have seen some of these patients develop real psychoses. One patient even after the lesion was healed, had to spend over a year in a mental institution to recover from the reaction. The mental strain of this day by day anguish wears them down like a Chinese water torture. No progress was made in combating this infection.

#### CLINICAL DIAGNOSES

Ulcer of the left axilla  
Embolism of left femoral artery with gangrene of the extremity

#### DR LELAND S. MCKITTRICK'S DIAGNOSES

Chronic ulcer (anaerobic streptococcus) of the left axilla  
Thrombosis of the abdominal aorta with gangrene of the left leg

#### ANATOMIC DIAGNOSES

Chronic undermining ulcers, multiple, left axilla back antecubital space, and right arm  
Aortic thrombi, multiple, with occlusion at the bifurcation, and with necrosis of the wall  
Gangrene of the left lower leg  
Infarction of the spleen, multiple  
Infarction of the kidneys, multiple  
Arteriosclerosis moderate aortic  
Pulmonary tuberculosis healed apical, left  
Pleuritis, chronic fibrous, apical, left  
Emaciation, marked

#### PATHOLOGIC DISCUSSION

DR BENJAMIN CASTLEMAN. The autopsy showed an emaciated man whose left forearm had been amputated. There was, of course, the huge undermined ulcerated lesion in the left axilla. In addition there were abscesses in the right antecubital space and one on the back. The cause of the gangrene of the left leg was a thrombus beginning about seven centimeters above the bifurcation of the aorta and extending into both common iliac arteries, only partially filling the right but completely occluding the left. In the proximal portion of the descending thoracic aorta about eight centimeters below the arch were two mural thrombi, one about two centimeters in diameter and another slightly smaller one. There were infarcts in the spleen and in both kidneys which undoubtedly were produced by emboli from the aortic wall thrombi.

DR CHURCHILL. Can you connect it with the transfusion?

DR CASTLEMAN I was going to bring up the question whether the immunotransfusion may have initiated the thrombus and the second transfusion caused some of it to break off

DR CHURCHILL The immunotransfusion was given in March

DR CASTLEMAN I do not see how one can possibly tell whether the transfusions were responsible

DR MCKITTRICK It is possible that it is the same process that we used to see in nonspecific protein therapy, where we saw thrombosis occur due to the slowing of the circulation in the prechill period, resulting in the loss of several limbs, so that we had to discontinue it or keep the limb heated up to 140°

DR CHURCHILL The first transfusions he had apparently did not produce any symptoms, no chills at all

DR MCKITTRICK The onset of the thrombosis occurred very comparable in time to what it did in those cases that we used to see when we were using intravenous vaccine I saw two or three and they occurred directly following the chill

DR CHURCHILL The thrombus might have been there and the transfusion could have brought on the symptoms I do not know of any mechanism by which the transfusion would produce this Given a mural thrombus, with partial occlusion of the vessel, a slight vasoconstriction reaction could conceivably bring into evidence the latent vascular obstruction

We are perhaps placing entirely too much stress on this transfusion You must realize that we had a man dying anyway of this massive ulcer

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## SERUM THERAPY OF MENINGOCOCCIC MENINGITIS

In a recent article Hovne<sup>1</sup> has recommended the intravenous treatment of meningococcic meningitis with meningococcus antitoxin and has cited the results obtained with such therapy at the Cook County Hospital and the Municipal Contagious Disease Hospital Chicago in support of his claims. Whereas the fatality rate for meningococcic meningitis at the Cook County Hospital during nineteen years prior to 1934 varied from 35 to 90 per cent with an average of 51 per cent 201 patients since then have received antitoxin *intravenously* and *intrathecally* with a fatality rate of only 27 per cent. Furthermore ninety-six patients have received only massive doses of either antitoxin or antibacterial serum *intravenously* with a fatality rate of but 16 per cent.<sup>1</sup> Such results are astonishing but require further analysis in view of the rather radical changes from the accepted method of treatment.

What evidence has been submitted to prove

that the antitoxin is a more effective therapeutic agent than the usual antimeningococcic serum?<sup>2</sup> In his first article on the use of antitoxin Hovne reported results that were very favorable to its use. Although the alternate case method was not used one case out of about four received antitoxin. The fatality rate for the cases treated with antitoxin was 24 per cent and for those treated with antimeningococcic serum was 46 per cent. It should be noted that the treatment of the former group was apparently somewhat more intensive than that of the latter as the total dosage averaged 162 and 124 cc respectively and that a higher percentage of individuals with a poor prognosis—over 20 years of age—were included in the latter group.

In England Banks<sup>3</sup> has reported a fatality rate of 35 per cent in twenty-six cases treated with antitoxin and a rate of 61 per cent in thirteen comparable cases treated with standard antimeningococcic serum. In Hovne's present series which included only intravenously treated cases there is little to indicate that the antitoxin is more efficacious than serum in spite of the fact that the average dosage of the former was 660 cc<sup>4</sup> and that of the latter was 363 cc. Of the patients under 20 years of age in twenty-six antitoxin treated cases there were no deaths and in seventeen serum treated cases only one whereas of the patients over 20 years of age there were two fatalities among five antitoxin treated cases and only four among eighteen serum treated cases.

What evidence has been submitted to prove that intravenous therapy alone is more efficacious than combined intravenous and intrathecal therapy? Hovne's combined mortality rate of 16 per cent is remarkably low but the results of the combined therapy on a group of comparable cases are not given and the fact cannot be overlooked that Tillett and Brown<sup>5</sup> have reported a series of nineteen proved cases in Baltimore treated during 1935 by the combined method with only one death—a fatality rate of 5 per cent. Furthermore nearly half of the patients of the latter group were over 20 years of age and the average doses of serum were 44 cc intravenously and 117 cc intrathecally.

Until more evidence in favor of meningococcus antitoxin and in favor of intravenous therapy has accumulated, it would seem wise for the physician to employ the standard method of treatment. Early in the disease intravenous and intrathecal antimeningococcic serum should be administered every six or eight hours. Later in the course of the disease the route and frequency of the injections should be governed by the condition of the patient and the laboratory.

The current retail cost of this amount is approximately \$165.00

examinations There seems to be little or no evidence that cisternal and intraventricular injections are warranted except in cases with spinal block In such instances, a single cisternal tap followed by lavage with sterile salt solution is frequently all that is required to re-establish drainage To be effective the serum used must be capable of agglutinating the meningococcus isolated from the case in relatively high dilution Like all other treatment with antibacterial serums, the earlier it is begun the better the prognosis

## REFERENCES

- 1 Hoyne A L Intravenous treatment of meningococcal meningitis with meningococcus antitoxin J A M A 107 478 (Aug 15) 1936
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The medical professors of those days were enormously well-to-do in comparison with those of today Many of them are believed to have received as much as \$8,000 per year, a proportionate figure for which is reached by relatively few of our modern specialists, and by none of our bona fide professors

Among the methods used to minimize pain are mentioned the use of opium, water of night shade, henbane, mesmerism and strapping above the point of operation in order to numb the nerves Noise to divert the patient was also employed In this connection one should not forget the old naval method of a well measured tap with a padded marlinspike—probably the most efficient pain killer of them all Nor should

one trained in modern laboratory calibrations fail to appreciate the nicety of touch which could produce the proper degree of concussion to tide a patient over a painful manipulation!

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OSGOOD WINTHROP B M.D Tufts College Medical School 1928 Senior Physician, Boston State Hospital Address Boston State Hospital Dorchester Center Mass Associated with him is

TRAPP CARL E M.D Boston University School of Medicine 1932 Formerly Senior Physician Psychiatric Clinic Boston State Hospital Assistant in Neurology Boston University School of Medicine Staff Member in Neurology and Psychiatry Massachusetts Memorial Hospitals Address 232 Bay State Road Boston Mass Their subject is A Study of Four Hundred Juvenile Delinquents (Statistical Report) Page 623

The Massachusetts Medical Society

STATED MEETING OF THE COUNCIL

A STATED meeting of the Council of the Massachusetts Medical Society will be held in John Ware Hall Boston Medical Library, 8 Fenway Boston, on Wednesday, October 7 1936 at 11 a m.

Business

- 1 Call to order at 11 a m.
- 2 Reading record of last meeting in abstract
- 3 Report of Committee of Arrangements for Annual Meeting
- 4 Report of Committee on Membership and Finance
- 5 Reports of committees to consider petition for restoration to the privileges of fellowship and appointment of new committees
- 6 Appointment of an auditing committee
- 7 Fill any vacancies in the offices of the Society
- 8 Incidental Business

ALEXANDER S BEGG M.D,  
Secretary

Boston September 29, 1936

Councilors are asked to sign one of the two attendance books before the meeting The Cotting Lunch con will be served immediately after the meeting

MISCELLANY

THE NEW YORK PUBLIC HEALTH LABORATORY

The new public health laboratory of the Board of Health of New York City will be dedicated with formal exercises on the afternoon of October 6 Addresses will be given by Dr Thomas Parran Surgeon-General of the United States Public Health Service Professor C E A Winslow of Yale Univer

sity Dr William H Park founder and director-emeritus of the laboratory Dr Charles Gordon Herd president of the American Academy of Medicine Dr Anna Williamson for many years assistant to Dr Park Dr George McCoy director of the National Institute of Public Health Dr Augustus Wadsworth director of the New York State Laboratory at Albany and Mayor F H La Guardia The laboratory has been built with \$700 000 from funds appropriated by the Public Works Administration, of which thirty per cent was an outright grant and seventy per cent a long term loan The laboratory will be known as the William Hallock Park Research Laboratory in honor of its founder—Science 84 244 (Sept 11) 1936

DIABETES DEATH RATE UNCHANGED FOR 1935

A recent report of Frederick L Hoffman is to the effect that the maximum diabetic death rate was 25 per 100 000 of the population in the United States for 1935 This is higher than elsewhere and for example is twice as high as in Canada

In explanation Hoffman is quoted in *The New York Times* of September 20, as stating

"It is shown by tabulation that high diabetes death rates coincide with excessive sugar consumption. The correlation is far from perfect but nevertheless significant that the United States should show a sugar consumption considerably above the average for the world at large

HEALTH OFFICERS MONTHLY STATEMENT OF VENEREAL DISEASES REPORTED IN THE NEW ENGLAND STATES

JULY 1936

This statement is issued monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases The following reports were received from State Health Officers The figures are preliminary and subject to correction It is hoped that this will stimulate more complete reporting of these diseases

State	Syphilis		Gonorrhea	
	Cases Reported During Month	Monthly Case Rates per 10 000 Population	Cases Reported During Month	Monthly Case Rates per 10 000 Population
Connecticut	217	1.26	140	.82
Maine	42	.50	57	.67
Massachusetts	476	1.09	548	1.25
New Hampshire	10	.20	19	.38
Rhode Island	88	1.29	53	.78
Vermont	34	.90	53	1.41

examinations There seems to be little or no evidence that cisternal and intraventricular injections are warranted except in cases with spinal block In such instances, a single cisternal tap followed by lavage with sterile salt solution is frequently all that is required to re-establish drainage To be effective the serum used must be capable of agglutinating the meningococcus isolated from the case in relatively high dilution Like all other treatment with anti-bacterial serums, the earlier it is begun the better the prognosis

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Don't try to scold health into your children. Example is better than precept. They see more than we think.

Insurance companies report an increase in deaths from heart disease of more than three times between 1930 and 1935. This is twice as many victims as are due to cancer and of the number there are three times as many men as women. Doctors believe the greatest single factor is hypertension due to strain, rush and excitement. Heart disease is the most frequent cause of death among physicians, most of whom refuse to relax the tension involved in their responsibilities and literally die in the service of their patients, usually not unaware of what they are doing.

Shakespeare said: By medicine life may be prolonged, yet death will seize the doctor too.—*Excerpt from the Bulletin of the New York State Medical Society*

### PUBLIC HEALTH NURSES

If the ten largest cities in the United States were ranked as to the number of public health nurses in each per 100,000 inhabitants, New York would be next to the bottom of the list. Boston is well in the lead with 45. The others follow in this order: Detroit 32, Cleveland 30, Milwaukee 30, Pittsburgh 28, Baltimore 26, St. Louis 22, Philadelphia 19, New York 18 and Chicago 17.—*The New York Times*, September 26, 1936.

### RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR AUGUST 1936

Disease	Aug 1936	Aug 1935	5 yr average*
Anterior Poliomyelitis	7	481	218
Chickenpox	118	97	109
Diphtheria	19	22	77
Dog Bite	1,063	1,117	681
Epidemic Cerebrospinal Meningitis	6	4	4
German Measles	45	89	39
Gonorrhea	562	546	644
Lobar Pneumonia	126	123	91
Measles	229	130	152
Numps	207	225	164
Scarlet Fever	156	174	246
Syphilis	462	444	382
Tuberculosis Pulmonary	289	319	321
Tuberculosis Other Forms	31	35	37
Typhoid Fever	13	15	25
Undulant Fever	11	2	1
Whooping Cough	534	293	517

Based on figures for preceding five years.

### RARE DISEASES

*Anterior poliomyelitis* was reported from Arlington, 1, Attleboro 1, Boston 1, Chelsea 1, Everett 1, New Bedford 1, Wilbraham 1, total 7.

*Diphtheria* was reported from Barre 1, Boston 7, Lowell 3, Lynn 5, Medford, 2, New Bedford 1, total 19.

*Dysentery bacillary* was reported from Worcester 1.

*Encephalitis lethargica* was reported from Lowell, 1.

*Epidemic cerebrospinal meningitis* was reported from Andover 1, Boston 2, Falmouth 1, Greenfield 1, Worcester 1, total 6.

*Malaria* was reported from New Bedford 1.

*Pellagra* was reported from Norton 1.

*Septic sore throat* was reported from Abington 1, Beverly 1, Boston 1, Foxboro 2, total 5.

*Tetanus* was reported from Groveland, 1.

*Trachoma* was reported from Boston 2, Cambridge 1, Malden, 1, Medford 1, total 5.

*Trichinosis* was reported from Chicopee 2, Concord 1, Lowell 2, total 5.

*Typhoid fever* was reported from Attleboro 1, Everett 1, Lowell 4, Lynn 1, New Bedford 2, Newton 2, Salem 1, Saugus 1, total 13.

*Undulant fever* was reported from Dalton 1, East Brookfield 1, Hardwick 1, Holyoke 1, Lenox 1, New Marlboro 1, Pittsfield 2, Springfield 1, West Brookfield 1, Worcester, 1, total 11.

Diphtheria to date is being reported seven per cent below last year's record low figure.

Anterior poliomyelitis and typhoid fever had their lowest reported August morbidity.

Pulmonary tuberculosis to date is being reported slightly below last year's figure.

Lobar pneumonia, measles, mumps and whooping cough were reported somewhat above the five-year average.

The reporting of epidemic cerebrospinal meningitis, German measles and chickenpox showed nothing remarkable.

Scarlet fever was reported well below the five-year average for the month.

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### RECENT DEATHS

**MINER**—HAROLD EDSON MINER, M.D., aged 54, of Holyoke and State District Health Officer for the Connecticut Valley District, died suddenly, September 15, 1936, while engaged in his official duties.

Dr. Miner was a native of Holyoke and was educated in the local schools. He received his medical degree from the College of Physicians and Surgeons in Baltimore in 1905 and interned at the Holyoke Hospital. After a few years of general practice in Holyoke, he was appointed as school physician to which work he devoted his entire time for eight years. In November 1920, he joined the staff of the Massachusetts Department of Public Health, being appointed as District Health Officer and serving in this capacity until his death.

Of few persons can it be said that they were as



COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1935  
AND SEVEN YEAR AVERAGE

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Diseases	1936				Average cases reported for week corresponding to Sept 12 for past seven years	1935			
	Week ending Aug 22	Week ending Aug 29	Week ending Sept 5	Week ending Sept 12		Week ending Aug 24	Week ending Aug 31	Week ending Sept 7	Week ending Sept 14
Anthrax	—	—	—	—	—	1	—	—	—
Chickenpox	5	10	4	7	4	12	2	2	3
Diphtheria	—	1	—	4	8	2	2	3	1
Dysentery Bacillary	3	4	2	4	1	5	12	9	46
Encephalitis Epidemic	—	—	—	—	—	1	1	—	3
German Measles	6	2	4	2	1	—	—	2	—
Influenza	—	1	3	—	3	—	—	—	1
Measles	10	3	6	4	7	16	5	1	4
Meningococcus Meningitis	—	1	—	—	—	1	3	1	—
Mumps	16	19	23	22	8	4	7	5	10
Paratyphoid Fever	—	—	—	1	—	4	1	4	12
Pneumonia (Broncho)	6	6	7	6	9	7	10	7	6
Pneumonia (Lobar)	6	3	7	6	7	11	5	5	6
Poliomyelitis	1	—	1	—	15	40	39	38	38
Rocky Mountain Spotted Fever	—	—	—	—	—	—	—	—	1
Scarlet Fever	3	3	7	10	11	6	13	8	22
Streptococcus Sore Throat	2	—	1	—	1	—	1	1	1
Tetanus	—	1	1	—	—	—	—	—	1
Trachoma	—	—	—	1	—	—	—	—	—
Trichinosis	—	—	—	—	—	—	—	1	—
Tuberculosis (Pul)	18	21	21	15	24	33	12	14	17
Tuberculosis (O F)	—	—	3	1	3	4	—	—	—
Typhoid Fever	1	4	2	2	5	2	3	1	6
Undulant Fever	1	1	2	—	—	3	1	—	—
Whooping Cough	53	104	33	49	37	37	27	33	70
Gonorrhea	62	46	25	34	44	20	61	21	53
Syphilis	63	38	55	34	36	26	81	22	49

Remarks No cases of Asiatic cholera glanders plague or yellow fever during the past seven years

DO YOU KNOW?

The first incubator patent was issued December 27 1870 to J and H Graves of Boston Massachusetts

Diabetes is increasing Early diagnosis with proper treatment following enables the patient to live a useful life Most diabetics are fat, though of course not every fat person gets diabetes

More injuries in athletic sports occur to the knee than to any other place in the body according to Dr Marcus H Hobart of Northwestern University

One source of automobile accidents to people with otherwise normal eyes is a narrowed peripheral vision which enables the driver to see only what

is directly in front of him and a little to each side of his direct gaze

General Jan Smuts said The disappearance of the sturdy independent minded freedom loving individual and his replacement by a servile standardized mass mentality is the greatest human menace of our time

The first medical school in the United States was established at the University of Pennsylvania Philadelphia May 3 1765 The first doctor to receive a diploma there was John Archer who was graduated with nine others in 1768

Records at Bellevue Hospital New York City show a marked increase in alcoholism during the past year

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Measles	10	3	6	4	7	16	5	1	4
Meningococcus Meningitis	—	1	—	—	—	1	3	1	—
Mumps	16	10	23	22	8	4	7	5	10
Paratyphoid Fever	—	—	—	1	—	4	1	4	12
Pneumonia (Broncho)	6	6	7	6	9	7	10	7	6
Pneumonia (Lobar)	6	3	7	6	7	11	5	5	6
Poliomyelitis	1	—	1	—	15	40	39	38	38
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Scarlet Fever	3	3	7	10	11	6	13	8	22
Streptococcus Sore Throat	2	—	1	—	1	—	1	1	1
Tetanus	—	1	1	—	—	—	—	—	1
Trachoma	—	—	—	1	—	—	—	—	—
Trichinosis	—	—	—	—	—	—	—	1	—
Tuberculosis (Pul)	18	21	21	15	24	33	12	14	17
Tuberculosis (O F)	—	—	3	1	3	4	—	—	—
Typhoid Fever	1	4	2	2	5	2	3	1	6
Undulant Fever	1	1	2	—	—	3	1	—	—
Whooping Cough	53	104	33	49	37	37	27	33	70
Gonorrhea	62	46	25	34	44	20	61	21	53
Syphilis	63	38	55	34	36	26	81	22	49

Remarks No cases of Asiatic cholera glanders plague or yellow fever during the past seven years

## DO YOU KNOW?

The first incubator patent was issued December 27 1870 to J and H Graves of Boston Massachusetts

Diabetes is increasing Early diagnosis with proper treatment following enables the patient to live a useful life Most diabetics are fat though of course not every fat person gets diabetes

More injuries in athletic sports occur to the knee than to any other place in the body according to Dr Marcus H Hobart of Northwestern University

One source of automobile accidents to people with otherwise normal eyes is a narrowed peripheral vision which enables the driver to see only what

is directly in front of him and a little to each side of his direct gaze

General Jan Smuts said The disappearance of the sturdy independent minded freedom loving individual and his replacement by a servile standardized mass mentality is the greatest human menace of our time

The first medical school in the United States was established at the University of Pennsylvania Philadelphia May 3 1765 The first doctor to receive a diploma there was John Archer who was graduated with nine others in 1768

Records at Bellevue Hospital New York City, show a marked increase in alcoholism during the past year

## SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY OCTOBER 5 1936

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5 p m The Edward K Dunham Lectureship Harvard Medical School Amphitheater Building C

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\*Open to the medical profession

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October 1—Faulkner Clinical Meeting Faulkner Hospital, 5 p m

October 4-17—Medico-Military Inactive Duty Training Mayo Foundation See page 512, issue of September 10

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October 6 and 8—The Edward K Dunham Lectureship Harvard Medical School Amphitheater Building C at 5 p m See page 565 issue of September 17

October 6-31—Boston Dispensary Medical Conference Program See page 638

October 7—New England Dermatological Society See page 638

October 8—Medical Clinic Peter Bent Brigham Hospital See page 638

October 8—New England Society of Psychiatry See page 638

October 8—Pentucket Association of Physicians Hotel Bartlett, 95 Main Street Haverhill, at 8 30 p m

October 12-16—Twenty-First International Assembly of the Inter-State Post-Graduate Medical Association. See pages 565 and 566 issue of September 17

October 12-18—Third International Congress on Malaria. See page 1075 issue of May 21.

October 19-23—Clinical Congress of the American College of Surgeons See page 180 issue of January 23

October 19-31—1936 Graduate Fortnight of the New York Academy of Medicine See page 1221, issue of June 11.

October 20-22—Academy of Physical Medicine Annual Meeting Hotel Statler Boston. See page 601 issue of September 2.

October 20-23—The American Public Health Association. See page 1225 issue of June 11.

November 16—One hundredth anniversary of the founding of the Army Medical Library 7th Street and Independence Avenue S W Washington D C

December 3-5—Annual Conference of the National Society for the Prevention of Blindness Columbus Ohio March 30 April 2, 1937—First International Conference on Fever Therapy Postponement notice See page 52 issue of July 2

April 21-24 1937—American Society for Experimental Pathology See page 1075 issue of May 21.

## DISTRICT MEDICAL SOCIETIES

### FRANKLIN DISTRICT MEDICAL SOCIETY

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CHARLES MOLINE M.D Secretary

Sunderland

### MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

October 7—Bear Hill Golf Club Stoneham.

November 18—Bear Hill Golf Club Stoneham

January 13 1937—Bear Hill Golf Club Stoneham

March 16 1937—Danvers State Hospital Danvers

May 11, 1937—Bear Hill Golf Club Stoneham

KENNETH L MACLACHLAN M.D Secretary  
1 Bellevue Avenue Melrose

### PLYMOUTH DISTRICT MEDICAL SOCIETY

October 15—11 a. m at the Moore Hospital Brockton.

FRED F WEINER M.D Secretary  
231 Main Street Brockton

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October 14—Rutland State Sanatorium Rutland Mass 6 15 p m Dinner—complimentary by the State Hospital. 7 30 p m Business session and scientific program

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Wednesday Afternoon and Evening May 12, 1937—Annual Meeting Time and place for this meeting will be announced in an early spring issue of the Journal.

ERWIN C MILLER M.D Secretary  
27 Elm Street, Worcester

## BOOKS RECEIVED FOR REVIEW

A Text Book of Pathology W G MacCallum Sixth Edition 1277 pp Philadelphia and London W B Saunders Company \$10 00

An Introduction to Psychological Medicine R G Gordon N G Harris and J R Rees 386 pp London Oxford University Press \$4 00

A Text Book of Neuro-Anatomy Albert Kuntz Second Edition, Thoroughly Revised. 519 pp Philadelphia Lea & Febiger \$6 00

Medicine and Mankind Edited by Iago Galdston. 217 pp New York and London D Appleton-Century Company \$2 00

International Clinics. Edited by Louis Hamman Volume III. Forty-Sixth Series 1936 339 pp Philadelphia, Montreal London J B Lippincott Company

universally liked and respected as was Dr Miner Gentle of manner, eager and enthusiastic in his work he gave unstintingly of his energies and strength to the promotion of the public health of the Western part of the State No problem was too small to merit his attention no obstacle too great to be overcome The progress of public health in his district was in very large measure a reflection of his work In his passing the State loses a public servant of the highest type, the community a staunch worker for human betterment, and his host of acquaintances a true friend whose memory will forever serve to strengthen and to comfort

Dr Miner is survived by his widow, Mrs Blanche T Miner, and five sons, Frederick, Harold, Philip Donald and Malcolm

**BRYANT**—JOHN EDMUND BRYANT, M.D., a retired physician of 114 Chestnut Street, Haverhill, Mass achusetts, died at his home September 18, 1936

Dr Bryant was born in Brownington, Vermont, in 1876 and graduated from the Dartmouth Medical School in 1901 He was a Fellow of the Massachusetts Medical Society

His widow and two daughters survive him

**WILLIAMS**—FRANKWOOD EARL WILLIAMS M.D., of 44 West 12th Street New York City died aboard the White Star Liner Georgic September 25 1936

Dr Williams was born in Cardington Ohio in 1883, and graduated from the University of Michigan Medical School in 1912 He was formerly a director of the Massachusetts Society for Mental Hygiene and an official of the Boston Psychopathic Hospital

## NOTICES

### BOSTON DISPENSARY

25 Bennet Street, Boston

#### MEDICAL CONFERENCE PROGRAM

Lecture Room Second Floor  
9 10 a. m October 1936

Tuesday October 6—Diseases and Injuries of Knee Joints Dr John D Adams

Wednesday October 7—Hospital Case Presentation Dr S J Thannhauser

Thursday October 8—Endocrine Clinic Dr C H Lawrence

Friday, October 9—Clinical Aspects of Paroxysmal Rapid Heart Action Dr Samuel A Levine

Saturday October 10 — Hospital Case Presentation. Dr S J Thannhauser

Tuesday, October 13—Diagnosis and Management of Pelvic Inflammatory Disease Dr L E Phaneuf.

Wednesday October 14—Hospital Case Presentation Dr S J Thannhauser

Thursday October 15 — Measles Prevention Dr Robert W Buck

Friday, October 16 — Agranulocytosis Dr William P Murphy

Saturday, October 17 — Hospital Case Presentation. Dr S J Thannhauser

Tuesday, October 20 — Treatment of Gastro-intestinal Disorders in Infants Dr Francis McDonald

Wednesday, October 21 — Hospital Case Presentation Dr S J Thannhauser

Thursday, October 22—Social Service Case Presentation Miss E C Canterbury

Friday, October 23—Recent Work in Epilepsy and Migraine Dr William G Lennox

Saturday October 24 — Hospital Case Presentation Dr S J Thannhauser

Tuesday October 27—The Use of the X Ray in the Diagnosis of Pulmonary Silicosis and Asbestosis Dr A. W George

Wednesday, October 28—Hospital Case Presentation Dr S J Thannhauser

Thursday October 29—Some Recent Work in Diabetes Mellitus Dr E A. Grossman

Friday October 30—Parathyroid Disease Dr Fuller Albright

Saturday October 31 — Hospital Case Presentation. Dr S J Thannhauser

### MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p m on Thursday October 8, in the Amphitheater of the Peter Bent Brigham Hospital Dr James P O'Hare Assistant Professor of Medicine Harvard Medical School and Senior Associate in Medicine Peter Bent Brigham Hospital, will give a medical clinic To it are cordially invited practitioners and medical students

### APPOINTMENT OF DR H D ADAMS

Dr Herbert D Adams formerly Assistant Visiting Surgeon to the Massachusetts General Hospital has been appointed to the permanent Surgical Staff of the Lahey Clinic

## NOTICES OF MEETINGS

### NEW ENGLAND SOCIETY OF PSYCHIATRY

The fall meeting of the New England Society of Psychiatry (The New England District of the American Psychiatric Association) will be held at the Brattleboro Retreat, Brattleboro Vermont Thursday October 8 For further information address Harlan L Paine M.D., Secretary-Treasurer North Grafton, Mass

### NEW ENGLAND DERMATOLOGICAL SOCIETY

The next meeting of the New England Dermatological Society will be held Wednesday October 7 at 3 p m at the Massachusetts General Hospital Boston

J HARPER BLAISDELL, M.D. *Secretary*

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International Clinics Edited by Louis Hamman Volume III Forty-Sixth Series, 1936 339 pp Philadelphia Montreal London J B Lippincott Company

Studies from The Rockefeller Institute for Medical Research Reprints Volume 99 583 pp New York The Rockefeller Institute for Medical Research 1936

Bulletin of the Neurological Institute of New York Edited by Charles A Elsberg Volume 5, August 1936 544 pp Baltimore Waverly Press Inc

Atlas of Congenital Cardiac Disease Maude E Abbott 62 pp New York The American Heart Association \$5 50

Fundamentals of Human Physiology J J R Macleod and R J Seymour Fourth Edition 424 pp St Louis The C V Mosby Company \$2 50

Principles of Chemistry Joseph H Roe Fourth Edition 475 pp St Louis The C V Mosby Company \$2 75

The Surgical Clinics of North America Volume 16, Number 3 June 1936 New York Number 912 pp Philadelphia and London W B Saunders Company

A Text Book of Physiology for Medical Students and Physicians William H Howell Thirteenth Edition 1150 pp Philadelphia and London W B Saunders Company \$7 00

Diseases of the Air and Food Passages of Foreign Body Origin Chevalier Jackson and Chevalier L. Jackson 636 pp Philadelphia and London W B Saunders Company \$12 50

## BOOK REVIEWS

Physical Therapy for Nurses Richard Kovács 286 pp Philadelphia Lea & Febiger \$2 75

This well illustrated 'handy' book of nearly 300 pages is conservative in attitude and written by a medically trained physical therapist of wide experience and ability. The first two chapters deal with the scope and purposes of the specialty of physical therapy as a branch of medicine and with the nature of the physical forces employed in the treatment of lesions of disease and injury.

Chapter III discusses the physiological effects of the application of heat and the various means whereby radiant heat may be most appropriately employed.

Heliotherapy and the various artificial substitutes for natural sunlight especially ultraviolet light receive intelligent consideration in Chapter IV. The author states that the general tonic effect of ultraviolet radiation is clinically recognized. As far as we are aware no carefully controlled clinical experiments have proved this general 'tonic' effect to be either striking or constant and we fear that such a statement will give support to what has been perhaps justly termed the ultraviolet racket of the manufacturers of ultraviolet apparatus. It is probably unwise to give the impression that during convalescence from operation in infectious diseases and in bronchial asthma light therapy has proved a valuable adjunct to general medical treatment. The Council on Physical Therapy of the American Medi-

cal Association, after reviewing many clinical studies and some laboratory research has decided to reject the apparatus of all firms which make claims in advertising to the public that ultraviolet light may be expected to have any wider therapeutic value than to prevent and cure rickets and to promote the development of sound bones and teeth.

Electricity with a hundred pages in Chapter V is perhaps unnecessarily technical for nurses use. The author evidently believes there is a large place for the use of the galvanic current in the convalescent therapy of poliomyelitis. This runs counter to the experience of several well-established clinics for the aftertreatment of infantile paralysis in which the method has been largely discontinued as being difficult to apply accurately to the affected muscles alone and of doubtful value.

In discussing diathermy, the author does well to point out the possible danger of the newer form of short wave diathermy as contrasted with the older form of application of high frequency current, or as it is usually called conventional diathermy. The operator of the short wave apparatus must depend entirely on the subjective heat sensation of the patient and has no objective means of determining excess heat either of the skin or of the deeper parts. This is especially important since in the short wave form more heat tends to be generated in the deeper and usually in the less conductive tissues, bones, articular cartilage and tendons than on the more sensitive skin surfaces. The author might well have mentioned the real danger which this method may offer to the avascular and largely insensitive articular cartilage which possesses slight power of repair and almost no power of regeneration once it is damaged. Dr Kovács is wise in his consideration of the administration of hyperpyrexia making it clear that artificial fever treatment in any form is a strictly institutional procedure to be applied in carefully selected cases under the direction of skilled physicians, the assisting nurses or technicians must have had ample training and must be capable of recognizing untoward symptoms and know the way to avoid dangers.

Chapters VI, VII and VIII cover fairly adequately the subjects of hydrotherapy, massage and exercise, the chapter on exercise being written by Madge C L McGuinness, MD, Chief of the Clinic Department of Physical Therapy, Vanderbilt Clinic, New York City.

There follows a chapter on Physical Therapy in Institutional Practice with practical suggestions as to personnel, the relation of a physical therapy to other departments of a general hospital, its desirable location and space, with a list of the equipment of the author's clinic and a record form.

A short syllabus and an index fill the remaining pages.

The book will be found quite as helpful to physicians as to nurses although it is written as a text book for the latter group with proposed examination questions at the end of each chapter. How technical the specialty is becoming is suggested by

the fact that in the list of equipment of the Polyclinic Hospitals Department of Physical Therapy, twenty-one of the twenty-five pieces of apparatus listed are electrical in nature. We might have wished for one more chapter in which due emphasis had been placed upon the important contributions which may be made to the well being and recovery of our patients by the application of the simpler and more easily grasped methods of physical therapy. This is a message which family physicians and nurses need greatly.

**Clinical Heart Disease** Samuel A. Levine 445 pp  
Philadelphia and London W. B. Saunders Company \$5.50

This most recent book of Boston cardiology is a collection of chapters written for the general practitioner. It does not attempt a systematic survey of the whole subject of heart disease although most of the important features are at least mentioned. Rheumatic fever, valvular and pericardial disease, angina pectoris, hypertension and the other chief etiologic agents of heart disease are considered. As a fundamental object of the book, emphasis is placed upon conditions for which truly remedial therapy exists. This leads, perhaps, to some over stressing of hyperthyroid heart disease—a subject which the author considers to be 'probably the most important aspect of all heart disease' because of the optimistic therapeutic implications. Pick's disease for which there exists similar but far less frequent opportunity for surgical therapy is less clearly described, the old impression being given that it may be found with valvular disease, a large heart and Broadbent's sign. An important cause of bloody pericardial fluid, namely malignant disease, is not mentioned in the chapter on diseases of the pericardium. Among the less important etiologic agents, diphtheria should have been given a place especially in the discussion of gallop rhythm, as also some word about the aberrations of glycogen storage in heart muscle, as recently shown to be a possible factor in congenital idiopathic hypertrophy.

The last eight chapters are concerned with special subjects such as paroxysmal rapid heart action, acute cardiac emergencies, factors involved in dyspnea, the significance of the systolic murmur, the cardiac patient as a surgical or obstetrical risk, prognosis and treatment of heart disease and clinical electrocardiography.

As the book has no footnotes or bibliography and does not attempt to cover the literature, it is occasionally much condensed. In places somewhat more detail would be of value in instructing the general practitioner. As an example, only a few words are given about the use of acetyl-beta-methylcholine in the treatment of paroxysmal tachycardia—a drug which cannot be used freely without the occurrence of alarming reactions at times which the physician should be ready to anticipate by having hypodermic atropine at hand.

Dr. Levine's early interest in the relationship between cryptic hyperthyroidism and heart disease resulted in the attempt to relieve heart failure congestive and anginal by complete ablation of the normal thyroid gland. He summarizes the present status of this procedure as follows: "The entire problem of the removal of the normal thyroid gland for intractable heart disease must still be regarded as in the experimental stage."

The chapter on electrocardiography comprises about one-quarter of the book and should serve very well to correlate clinical syndromes with their electrocardiographic explanations.

The author has been a stimulating teacher and careful observer and writer in the field of heart disease for many years. The book is to be recommended not only to students and general practitioners but also to those who are primarily interested in cardiovascular problems and wish a concise summary of his point of view.

**The Art of Treatment** William R. Houston 744 pp  
New York The Macmillan Company \$5.00

After reading Houston's compendium, one is tempted to indulge in superlatives. Of all the books on the art of therapeutics, this is the most interesting, the most thorough, the most practical. The use of the direct and forceful first person singular adds tremendously to the value of the work. The author has covered the field of treatment in a manner that is not only authoritative but he has also produced a book as readable and thrilling as the latest best seller. No words are wasted; there is a direct attack, the entire subject including fundamentals and the minor aspects, is most adequately discussed. The patient as a whole, not as a conglomeration of separate organs and processes, is held before the reader constantly. The impacts of modern society on the mind and body of the sufferer are never forgotten. The most comprehensive functions of the physician are constantly stressed.

This is a work that should be on the desk of every doctor who wants to give his patients the very best of treatment in its widest implications. The references to the literature of medicine and its immortals show a profound cultural background that is strongly reminiscent of Osler and his classic. A great future for this book is confidently predicted.

**Strength Out of Suffering** France Pastorelli 223 pp  
Boston and New York Houghton Mifflin Company \$2.00

This is the life of an invalid but a glorious adventure Madame Pastorelli has made of it. Just at the beginning of her promising career as a pianist she was stricken with a severe heart lesion. Her beloved art had been given up and her time spent in bed. But she would not acknowledge defeat. She has produced for us obtuse well folks an inspirational work that brings the blush of shame. As a pianist



ist she would doubtless have given thousands genuine pleasure, but her 'Strength' goes far deeper and leaves a more lasting impression than any other form of art could produce

**Les Petites Règles de la Chirurgie Parfaite** J. Okinczyk 60 pp Paris Masson et Cie 12 fr

This is a splendid short book, and emphasizes the necessity of paying attention to minor details in surgery. The fact that it is concise, well written and not didactic makes this short monograph worthy of an English translation. House officers in surgery would find this book very helpful. It contains much needed advice.

The following are a few of the especially interesting sentences

(1) All surgical acts are serious things, since minor operations may lead to major complications.

(2) There are always undeserved failures in surgery but to be sure there are also unmerited successes.

(3) Do not be too hasty in accusing the catgut or the sponges without assuring yourself that all the minor precautions were taken at the time of operation.

(4) Manual dexterity does not license one to dispense with necessary details. We are no longer in the era of bloody and rapid surgery.

(5) The progression of proper surgical manoeuvres is only a succession of imperceptible acts destined to gain one's end without traumatizing very vulnerable tissue.

(6) I will give my confidence to a fair surgeon but a good clinician rather than to a brilliant operator who knows no clinical medicine.

A section each is devoted to sutures, hemostasis, exposure, incisions and the teaching of surgery.

**A Textbook of Histology** Joseph Kravka, Jr 246 pp Baltimore The Williams & Wilkins Company \$2.50

This brief text on histology is planned for the college student with relatively little training in science. It is a readable introduction to the subject that would be of but little value to the medical student or practitioner. It might well be of service for the training of nurses.

**Medical Science Exhibits A Century of Progress** Eben J. Carey 204 pp \$2.00

This is a pictorial record of the exhibits contributed to the medical section of the Hall of Science at the Century of Progress Exposition, Chicago, 1933 and 1934. These exhibits were of interest in that this was the first health exhibit in any international exposition held in America. The various photographs will be of particular importance to those who have seen the exhibits and also to those having in mind a preparation of exhibits for both scientific and lay groups.

**Heart Disease and Tuberculosis Efforts Including Methods of Diaphragmatic and Costal Respiration to Lessen Their Prevalence** S. Adolphus Knopf 108 pp New York The Livingston Press \$1.25

This little book consists to a large extent of a series of letters from well known physicians who give the impression that they approve of the author's ideas concerning diaphragmatic respiration in the treatment of diseases of the heart, and tuberculosis. The author likewise gives a detailed description of the value of his window tent. In addition there are statements giving his ideas on tuberculosis and things in general which may or may not be of interest.

There is remarkably little of real value in this book.

**Report of the Penrose Research Laboratory Formerly Laboratory and Museum of Comparative Pathology of the Zoological Society of Philadelphia** Herbert Fox 30 pp 1936

This laboratory of comparative pathology obtaining its material from the garden of the Philadelphia Zoological Society is continuing its excellent work in advancing our knowledge. The continued interest of Dr. Fox and Dr. Ratcliffe has done a great deal to further the development of our knowledge of pathologic changes in wild animals. Such diverse findings are noted as nephritic changes in a Surinam toad and gall stones in wild boar.

**The Harvey Lectures** Delivered under the Auspices of the Harvey Society of New York 1934-1935 William B. Castle et al. Series XXX 270 pp Baltimore The Williams & Wilkins Company

Eight authorities, two of them foreign guests, contributed to this thirtieth series of Harvey Society lectures. Castle with his brilliant discussion of the etiology of macrocytic anemias and Blake of Yale with his enthusiastic elucidation of collapse therapy in pneumonia, contribute most interesting and readable sections of a notable publication.

**Diseases of the Respiratory Tract** Eighth Annual Graduate Fortnight of the New York Academy of Medicine J. Burns Amberson Jr. George Blumer et al. 418 pp Philadelphia and London W. B. Saunders Company \$5.50

The New York Academy of Medicine plans each year a graduate fortnight so that the busy practitioner may be informed from authoritative sources as to the last word on a given topic. Each year a subject is selected of outstanding importance in the practice of medicine and surgery. In the past years these have included disorders of the circulation, functional and nervous problems in medicine and surgery, tumors, disorders of metabolism and disease of the gastrointestinal tract. Included in this fortnight are evening lectures, demonstrations,

and an exhibit at the Academy with co-ordinated clinics in important hospitals of the city in the afternoon. For the recent symposium the subject chosen was Diseases of the Respiratory Tract, and the volume under discussion contains the evening lectures in this course.

The general subject is timely and the selection of the sub-topics to be considered and the men to give the papers is excellent. Twelve of the twenty subjects are discussed by outstanding authorities in New York City, and eight men of special ability were called in from outside. The subjects and the speakers presenting them are as follows:

- The Relation of Allergy to the Diseases of the Respiratory Tract, Maximilian A. Ramirez, New York City
- Common Cold, A. R. Dochez, New York City
- Sinus Disease from Infancy to Old Age, Charles T. Porter, Boston
- Diseases of the Larynx, Trachea, and Main Bronchi, Charles J. Imperatori, New York City
- Bronchoscopy in Relation to Diseases of the Respiratory Tract, Chevalier L. Jackson, Philadelphia
- Bronchiectasis, J. Burns Amberson, Jr., New York City
- Influenza of the Respiratory Tract, Henry T. Chickering, New York City
- Chronic Pneumonitis, Jonathan C. Meakins, Montreal
- Pneumonia in Childhood, Charles Hendee Smith, New York City
- The Evolution of Pulmonary Tuberculosis, James Alexander Miller, New York City
- Immunity in Tuberculosis, Arnold Rice Rich, Baltimore
- Surgery of Tuberculosis of the Chest, Adrian V. S. Lambert, New York City
- Pneumoconiosis with Particular Reference to Silicosis and Tuberculosis, Leroy U. Gardner, Saranac Lake
- Emphysema, David Riesman, Philadelphia
- Chronic Nontuberculous Empyema: Notes for the Physician and the General Surgeon, Howard Lillenthal, New York City
- Abscess and Gangrene of the Lungs, H. Wesler, New York City
- Pulmonary Thrombosis and Embolism, George Blumer, New Haven
- Atelectasis, Massive Collapse, and Related Postoperative Conditions, Yandell Henderson, New Haven
- Carcinoma of the Lung, Lloyd F. Craver, New York City
- Diseases of the Mediastinum, Harrison S. Martland, New York City

Of particular interest to the reviewer were the lectures on the Common Cold and Immunity in Tuberculosis. He also felt that there was an especially good presentation of the facts relating to Influenza, the Evolution of Pulmonary Tuberculosis, Pneumo-

coniosis, Abscess and Gangrene, Thrombosis and Embolism, Atelectasis, Carcinoma, and Diseases of the Mediastinum. The subject of Emphysema deserves a more complete handling than is afforded in this volume.

On the whole the volume is of interest and importance to men devoting themselves largely to diseases of the lungs and will also serve as it was intended that it should—to give the more general practitioner the important facts in the modern diagnosis and treatment of diseases of the respiratory tract.

**Pathological Physiology and Clinical Description of the Anemias.** William Bosworth Castle and George Richards Minot. Edited by Henry A. Christian. 205 pp. New York: Oxford University Press. \$3.00.

One of the disadvantages of articles appearing in systems of medicine is that the information in them is usually available only to subscribers to the complete set. The Oxford University Press, however, has, of recent years, been in the habit of publishing certain important chapters in separate volumes. In the present instance, particularly, it must prove of great advantage to the practitioner as this volume by Drs. Castle and Minot is unusually authoritative and complete. Not only well written, clear in expression and full of information available only in scattered papers in the recent literature, this book contains a most complete and accurate bibliography—a total of 646 references. The latter alone would make it a volume desirable to own, but the authors with a great deal of modesty say: "This bibliography is in no sense complete. Its objects are to suggest articles of interest to the clinician and to give access to a wider field of reading." As a summary of our present ideas in relation to the pathologic physiology of the anemias, there is no other volume at present available which in any way approaches this one in value.

**Maladies de la Nutrition.** F. Rathery. 173 pp. Paris: Masson et Cie Éditeurs. 22 fr.

This volume, like the preceding ones of a series covering all the special phases of medicine, has been written primarily for the medical initiate. It is concerned with the diseases of nutrition and metabolism and especially emphasizes the disorders in those fields that have received the most attention and study during the past few years.

The writer in the present book follows the general scheme of the brochures that have preceded it. After dealing briefly with the normal digestive requirements and the normal fat, sugar, and protein metabolism, he states which occur when the latter are pathologically altered, are described in brief yet embracing fashion. The subjects of the minerals and the vitamins in their relation to the human economy are taken up in similar manner. Special emphasis is placed quite naturally on diabetes, gout, and avitaminosis. The book as a whole is an ex-

cellent review of most of the accepted facts of the subject under consideration and although apparently rather brief contains most of the essential details and more important information in the vast field of nutrition. It is highly recommended to the medical student and practitioner. It should be of value to the internist desiring a rapid review of the subject.

**Medical History of Contraception** Norman E Himes  
521 pp Baltimore The Williams & Wilkins Com-  
pany \$7.00

'The farther a notion reaches back into primitive times for its origin, the more universal must be its extent, and its power in history is rooted in this universality' (Lippert, *Kulturgeschichte*). 'The desire for fertility control is neither time nor space bound. It is a universal characteristic of social life.' Out of the misty nebula of legendary folklore out of the cryptic references here and there in early historic literature, and from a detailed review of current publications a firm-fisted scholar has grasped substantial, authentic material on which to build the story of attempts at fertility control among all peoples. After reviewing the practice among 'pre-literate societies' of Africa, America, and Australia, he tells how it was done by the Egyptians, the Jews, the Romans, and the Greeks.

The efforts in China, India, and Japan, to enjoy sex physiology without paying nature's price and thus suffering famine or war or both are outlined. The "History of the Condom or Sheath," which uses twenty pages, brings the story home to the occident, and brings the reader up to the "democratization of technique" since 1800 in England and the United States. From then on through 200 pages it is a documented, detailed account of what we today call the birth control movement with its pros and cons, its ups and downs.

Perhaps because of his proved intimacy with his subject this capable author takes the liberty of expressing here and there but particularly in the last two chapters on the "democratization of birth control" and on the 'probable effects of democratized contraception,' his sympathy with artificial control of positive fertility. He merits great credit that until these last chapters which are mainly sociologic he shows toward the practice and the mechanics of contraception a commendable scientific detachment although, as he boldly exposes later, he is really a tugwellian materialist who rationally believes that a baby's worth may be expressed in economic and sociologic symbols. The enormous value of his book is not much diminished by this for the philosophic and psychologic value of babies to the mates who must have them is a factor which almost all commentators on the subject miss, and perhaps only the mates themselves can evaluate.

The reviewer's enthusiastic approval of this book could lead him astray into a discussion of these correlated values. He checks only to add that this excellent history offers to each male and female who can think and act pertinently, plenty of information

on a subject which profoundly affects the destiny of human beings. Professor Himes has erected a milestone in medical literature marked to show where we have come from and the direction we are going in the control of fertility.

**Experimental Studies on a Transmissible Myelomatosis (Reticulosis) in Mice** Otto Kaalund Jorgensen 142 pp Copenhagen Levin & Munksgaard, Sweden \$12.00

This detailed report summarizes nearly three years' work by the author in the field of leukoses in mice. It provides an interesting and stimulating companion work to the available studies by Furth on the lymphoblastic conditions in mice. The condition with which the author is working is of myeloid type and related to the transmissible leukoses of mice and guinea pigs, but essentially different from the transmissible fowl leukoses. The author regards the mammalian leukoses as being undoubtedly neoplastic in nature.

**A Diabetic Manual For Practitioners and Patients** Edward L. Bortz 222 pp Philadelphia F. A. Davis Co.

This manual summarizes the fundamental knowledge of diabetes desirable for patients to possess. Special topics have been covered by contributing authors: Diet Therapy by Sister Maude Behrman; Diabetes in Children by Walter M. Bortz; Surgery by J. M. Deaver; Dental Care by C. F. Hellwege; D.D.S. and Care of the Feet by A. Rappaport, D.S.C.

The discussions of treatment, both of diabetes and its complications, the differential diagnoses of coma, and of diet planning are concise and simple. Nine types of diets such as low fat, low protein, low residue, high caloric, and diets for different degrees of severity of diabetes are listed. Food tables include vitamin content and the composition of alcoholic beverages. The Shetel urine testing outfit is recommended. This will prove a useful book for physician and patient, although the use of the new protamine insulin is barely mentioned.

**Time of Ovulation in Women. A Study of the Fertile Period in the Menstrual Cycle** Carl G. Hartman 226 pp Baltimore The Williams & Wilkins Company \$3.00

Let no one who reads early in this book that 'the male of Darwin's frog pipes his love call to the female only to receive the fertilized eggs stuffed down his vibrant throat where he thenceforth incubates them in becoming, henpecked silence' or that the '2,000,000,000 eggs from which will arise the next generation of mankind would all fit into a derby hat,' or that the sperms to fertilize them could be encompassed by an ellipse the size of the capital O of the print, be misled into underestimating this little book as the pot boiler of a professional scribe. It is on the contrary a judicious scrutiny of all the useful research in animals and man which throws

light on the physiology of ovulation in woman and a consideration of whether the knowledge we have thus acquired can be used in the control of human fertility

With fine discrimination the essential details of reproductive physiology are related as an introduction. What few scientific data there are on human menstruation is then sifted out of the mass of traditional assumptions and speculations. The author then settles down to consider what relation exists between the time of ovulation and menstruation. The scant and untrustworthy evidence which women themselves have volunteered is mentioned, that from the inaccurate assay of hormone changes is included and slightly overestimated. Likewise that from the studies of hormone effects on uterine motility made by Knaus and others, is given in detail and accepted with appropriate reservations. The evidence from the objective studies of ovaries by Ogino and others especially by the author himself is brought forward clearly and effectively, that from consideration of case histories of dated human coitus productive or not, is properly discounted. The flimsy evidence from the finding of free eggs and the age of human embryos is not neglected. With becoming modesty the author's own studies of the fertile period in the monkey, which throw the brightest light of all on to this obscure subject are mentioned very briefly but with expression of the fact that his are the only data which "are both comprehensive and conclusive." "There is an absolute Safe Period for the monkey female." This justly famed biologist then indulgently includes a chapter on the "practical use of the rhythm of fertility and sterility" and with commendable conservatism opines "that most women would remain sterile by abstaining from sexual intercourse between the seventh and the twenty-first night after the beginning of the bleeding."

If the practical, clinical value of this excellent timely discussion could be improved upon it would be by the warning that an ovulatory menstruation closely stimulating the shedding of a predeciduum and unrecognized as a specious flow, is not uncommon in women over thirty-five and is frequent in women over forty and that when it occurs ripe follicles ready to rupture any time before during or after the flow are usually present in the ovary. As pregnancy is possible when the follicle ruptures for such women with such flow the safety of coitus can not be even guessed at by regard for the so called 'menstrual dates'.

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**Orthopaedic Surgery** Walter Mercer Second Edition. 906 pp. Baltimore William Wood & Company \$10.00

This most recent of textbooks on orthopaedic surgery is written in a most clear and concise manner. At times brevity ceases to be a virtue particularly in the discussion of therapy. The arrangement of the book is excellent. Subjects follow each other in logical sequence and the busy practitioner can

find the information he desires with a minimum of effort. Tuberculosis of bones and joints is discussed in a most able manner. The prominence given to tuberculosis suggests that it is a far more serious orthopaedic problem in Scotland than in America. On subjects where a difference of opinion can be debated, the data are carefully weighed and both sides are usually presented without prejudice.

The attitude of the book is one of conservatism, yet an open minded conservatism. There is a well-chosen list of references to medical literature on each topic discussed. A few faults should be mentioned. In an attempt at completeness, particularly in the chapter upon "Affections of the Skeleton" a number of rare pathologic or roentgenologic variants are described which do not yet have the status of a disease entity. One would like to see a fuller mention of apparatus and physiotherapeutic procedures because of their great importance in the armamentarium of the orthopaedic surgeon. The section on the back does not reach the clarity and completeness set by earlier chapters. The illustrations on the whole are well chosen, with a few exceptions.

The book reflects the English point of view on most subjects but shows familiarity with Continental European and American opinion as well. It must be adjudged the most readable and complete treatise on orthopaedic surgery yet appearing in the English language.

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**International Clinics** Edited by Louis Hamman  
Volume II Forty-Sixth Series 1936 327 pp  
Philadelphia, Montreal, London J. B. Lippincott Company

The rapid strides achieved in the basic sciences physiology and biochemistry insistently demand from the practicing physician studied effort to sustain his knowledge and interest in these fields. For upon them to a great extent does the clarity of conception of disease processes depend.

That the editor of this series is cognizant of this is attested to by the number of articles dealing with these subjects which in fact comprise the bulk of this volume. Thus we find discussed The Erythrocyte Sedimentation Test, Pathological Physiology of Emphysema, The Syndrome of Hemoconcentration, Extracellular Body Fluid and Nutritional Edema, among others.

It is more than a coincidence that these were written by men actually involved in bedside practice. Buttressed by other articles of interest this volume should prove extremely valuable and interesting.

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**Medical Mycology Fungous Diseases of Men and Other Mammals** Carroll William Dodge 900 pp  
St. Louis The C. V. Mosby Company \$10.00

In this book—the first of its kind in English—the author has accomplished the stupendous task of bringing together practically all the pathogenic

fungi known to man and animal Morphology is discussed and keys to families, genera and species are given

The first chapters are devoted to the general morphology of fungi with definitions and occasional illustrations, the physiology of fungi including the influence of hydrogen ion concentration, the preparation of culture media, and methods of isolation of micro-organisms One chapter is devoted to The International Rules of Botanical Nomenclature This nomenclature is followed throughout the volume

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Of necessity the subject matter is condensed perhaps too much so so that the beginner in medical mycology is baffled by the immensity of the subject However the well arranged and complete index is most helpful in clarifying synonymous terminology

One of the chief values of the book lies in its extremely comprehensive bibliography which makes it a source of practically all of the known mycologic literature It is a most valuable adjunct to any mycologic library

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**Handbook of Surgery** Eric C Mekie 699 pp Baltimore William Wood & Company \$4 50

It is stated in the preface of this admirable handbook that its purpose is to prepare the undergraduate student for the passing of his final examination in surgery at the Royal Infirmary in Edinburgh and that all that is now essential to the task of surmounting the final hurdle of the medical undergraduate career is excluded After careful reading the reviewer heartily agrees with John Fraser in his foreword that the author has covered the field so thoroughly that the *postgraduate* (and such a term has a wide inclusion) will find much to interest him

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ible cloth covers containing about 700 pages of excellent typography including a good index of 14 pages The text is presented throughout with topical and subtopical headings and information of differential nature is often presented in tabular form The supplemental 24 figures are well chosen are diagrammatic, and remarkably purposeful The text is divided into 41 chapters In addition to the above noted features, which appeal to the reviewer, are the introductions to the chapters These introductions in most instances present tersely the anatomy, embryology, physiology and pathology of the organ or anatomic region to be considered To the reviewer an understudy of such is fundamental in the teaching of surgery Without such a foundation upon which to build he believes the teaching of surgery lacks sound practical value to the student The teaching of the technic of various operations without such fundamental knowledge is like a heavy structure built on shifting sand A good surgeon should not only possess technical skill (which is largely inherent and cannot be but partially acquired by teaching) but he should have sound knowledge of anatomy and morbid anatomy He should understand physiology and should be able to recognize anomalies quickly The reviewer believes that this volume is not only a sound, practical handbook (designed as is stated in the preface for the undergraduate in surmounting his final examination) but one of immense practical value to the young surgeon in practice He will not find in it any description of the technic of operations but he will find in it information fundamental to the practice of intelligent surgery

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**Physician, Pastor and Patient** George W Jacoby 390 pp New York and London Paul B Hoeber Inc \$3 50

Jacoby out of a rich and unusually fruitful experience of many men of many minds with a colorful background of history traces the relationship from the earliest days of religion and medicine He deals judiciously with many of the moot topics to which men are sincerely giving thought euthanasia vivisection birth control, the divorce problem, and the cooperation of clergyman and physician for mutual help to the patient Beginning as much of it did, in superstition and empiricism medicine has had to fight its way, touched at many points by Judaism Mohammedanism and Christianity There is still a place where the liberal priest and open minded physician can meet to the advantage of us all in the management of mental diseases in legislation and in education of the public

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## NEW ENGLAND BRANCH AMERICAN UROLOGICAL ASSOCIATION

### NERVOUS DISTURBANCES OF THE VESICAL SPHINCTER\*

BY DEREK ERNEST DENNY-BROWN, M.B.†

*Mr President and Gentlemen*

I THANK you very much for the opportunity to talk to you about the work that I, with the assistance of some colleagues, have been doing in London. I feel some trepidation as a neurologist talking to you about the function of organs of which you all have much more intimate knowledge than I. However, in so far as one might consider micturition as one of those reflexes which are so dear to the hearts of the neurologists, and since the function is largely a reflex one, I will try to justify what I have to say.

I want to speak mainly about the conditions such as one finds in cases where there is a disturbance resulting from a lesion of the cauda equina, for I feel that when these are fully elucidated we shall have a much better understanding of disturbances of micturition resulting from tabes dorsalis and other spinal diseases. As you all know, the bladder and involuntary sphincter have two main sources of innervation. One is derived from the 12th dorsal, 1st lumbar and 2nd lumbar segments, passing through the sympathetic system to the inferior mesenteric ganglion and so down over the brim of the pelvis to reach the vesical plexus as the hypogastric or presacral nerve, the other passes from the 2nd and 3rd sacral nerve roots by way of the cauda equina to the sacral plexus and thence by what is called the pelvic or sacral nerve to the vesical plexus. The disturbance that I am going to talk about is one that brings interruption of the second pathway of nerve supply to the bladder, that is, of the sacral nerve roots which are the origin of the sacral nerve. A lesion of the cauda equina may cause a number of clinical signs, for the sacral nerve roots innervate the muscles of the perineum, the muscles of the calf and the skin segments covering a saddle-shaped area over the perineum, besides bringing to the bladder this second or sacral nerve supply.

It is generally understood that the center for micturition is situated in the sacrolumbar segments of the spinal cord. It is not unusual to find powerful reflex micturition developing in human cases of complete spinal transection above these segments. That is, at intervals as long as six to eight hours there is a powerful evacuation of the bladder, complete, beginning and terminating abruptly. This type of micturition does not immediately follow any sudden damage to the spinal cord. It is preceded by a stage of retention of urine lasting two or more weeks, a state we call spinal shock. Because in some animals, such as the domestic cat, reflex micturition does not emerge from spinal shock after any lesion below particular centres in the brain stem, some authorities postulate a centre for micturition in the brain stem. After transection of the spinal cord in man and in the dog, such fully developed micturition as I have spoken of is of common occurrence and can be demonstrated to depend on distention of the bladder. I believe, therefore, that in man the spinal cord contains, in the lumbosacral segments, all the nervous mechanism necessary for micturition except that which decides whether its occurrence would be appropriate to the environment. Spinal shock has some relation to centres in the brain stem, it is true, but its effect on micturition is the same as its effect on the knee jerk and other spinal reflexes. The state of retention of urine in these circumstances is a state of depression of reflex function.

Happening to observe closely a patient with a cauda equina lesion—a complete destruction of these nerve roots which numbered, in this case, from the lumbar 4th and 5th through all the sacral roots—I noticed that there was not a continuous overflow, as in many such cases, but periodic micturition at long intervals five or six times a day. There was a periodic complete emptying of the bladder which occurred as a distinct and efficient event, beginning gradually, working up to a steady stream and finishing fairly abruptly, with complete emptying of the bladder. The quantity of discharge was 200 to 300 cc of urine. The first point one

Read before the New England Branch of the American Urological Association, Boston, April 23, 1936.

†Denny Brown, D.E.—Assistant Physician 1935 and Chief Assistant Neurological Clinic St. Bartholomew's Hospital, London 1935. For record and address of author see "This Week's Issue" page 693.

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to the conclusion that whatever was the nature of the relationship between the bladder and the sphincter, it was one that was reciprocal with contraction of the bladder. The more the bladder contracted the more the sphincter relaxed, the more the bladder relaxed the more the sphincter contracted.

These observations were confirmed very soon afterwards on two other cases with complete cauda equina lesions.<sup>2</sup> Later we were fortunate enough to be able to examine a patient who had had the operation of complete presacral neurectomy for megacolon. He had never had any disturbances of micturition and he did not have any after the presacral neurectomy. We found in this patient that, coincident with waves of pressure induced in the bladder produced by distention, there was this reciprocal relationship going on in the sphincter. Therefore it seems possible to believe that the presacral or hypogastric nerves do not have any more to do with this mechanism than with the process starting or stopping micturition at will. In this fundamental condition of automatic micturition we are dealing with the vesical plexus and its supply to the bladder and the sphincter and the leading element is contraction of the bladder wall. Without contraction of the bladder wall nothing happens. The sphincter does not work independently. That, of course, is strongly suggested by the very obvious fact that, after a severe spinal lesion, such as transection of the spinal cord or transection of the cauda equina, the first stage is one of complete retention of urine with obstruction at the level of the sphincters. The bladder does not then contract when distended. The capacity of the bladder to contract has to develop first, and only when large enough contractions take place does the sphincter relax sufficiently for micturition to occur.

There are many suggested ways in which the sphincters of the bladder can function. The internal sphincter of Henle is a very insignificant ring-shaped involuntary muscle just at the neck of the bladder. The external sphincter which shields the lower part of the prostate in the male forms a very compact bundle of voluntary muscle, well situated to obstruct the urethra. In normal and in reflex spinal micturition the external sphincter opens and shuts very quickly by means of a reflex mechanism. It is a quickly contracting muscle, whereas the region of the internal sphincter closes and opens in a very gradual way. By cystoscopy the two sphincters can be readily differentiated by the lazy manner of contraction and relaxation of the internal as compared with the sudden snap of the external sphincter. Is the external sphincter responsible for the obstruction in these patients with automatic micturition? One can only say that there is never any sudden snap-like closure. The sphincter

always relaxes or contracts slowly and deliberately. This is seen in manometer records just as easily as through the cystoscope. So there is reason to believe that the external sphincter, in common with all the other striated muscles of the perineum in cases with cauda equina lesions, is atrophied and out of function and that its tone is not responsible for what we call the sphincter in such a state.

What then is the sphincter? Young<sup>3</sup> and Wesson<sup>4</sup> proposed, as a result of anatomic observations, that the ring-shaped internal sphincter was opened by a strip of muscle running longitudinally from the trigone and that a contraction of this particular piece of muscle pulled open the internal meatus. The opening of the internal sphincter would in that view be really due to contraction of a muscle which pulled it open, thus making a slit-like appearance of the internal meatus as it was observed by cystoscopy. An important observation in this connection is that originally made by Burns<sup>1</sup> in 1917 and since repeated by many others, namely that in x-rays of the bladder neck, when filled with opaque solution in many such cases the region of the internal sphincter and the prostatic urethra is found to be dilated into a funnel. The obstruction is distal to what is ordinarily called the internal sphincter. Both in the early stage of partial retention and in the stage of complete automatic micturition this funnel-shaped urethra occurs. Through the cystoscope Burns also observed in these cases dilation of the proximal part of the urethra so that the verumontanum and the walls of the meatus could be clearly seen. Later Schramm<sup>5</sup> also published notes of similar cystoscopic observations. The funnel-shaped urethra in x-ray films and the cystoscopic observation that the most proximal urethra is dilated in a large number of these cases<sup>4</sup> suggest that whatever is the cause of obstruction it is not the internal sphincter of Henle at the bladder neck. Further, the fixity of the prostate in the male and that of the triangular ligament would seem to deny the possibility of any mechanical kinking of the urethra as an explanation of the sphincter mechanism.

With my colleagues, Dr. Robertson and Dr. Lees, I have made a close examination of the phenomenon of the funnel urethra in patients with automatic micturition by making frequent x-ray films of the bladder at various intervals during pressure recording to see how the phenomenon develops and to determine its relation to the contractility of the bladder. When automatic micturition has developed in cases with cauda equina lesions, an x-ray film of the bladder with 25 cc of opaque solution within it reveals the region of the internal meatus as a small dimple or spike at the base of the bladder. If distention is continued that dimple



thought of was that this was not a complete lesion of the nervous system, that in some way this particular man had still some innervation of his bladder from the reflex mechanism in the spinal cord. Every function served by the sacral nerve was completely in abeyance through severe fracture of his lumbosacral spine. There remained, in connection with the bladder, the other source of nerve supply, the hypogastric nerve or presacral nerve which was, with the rest of the lumbar sympathetic outflow, still functioning, as shown by the fact that he could still sweat from his lower extremities (another function of that part of the sympathetic chain) and still perceive pain from the bladder.

Electrical stimulation of the hypogastric nerve causes a contraction of the internal sphincter. If that mechanism were effective in controlling micturition in this particular man, one would have supposed that, in the course of such micturitions as were occurring, he should have been able to stop his micturition by simply contracting his internal sphincter. One was surprised to find that he could not. Once micturition was commenced in any way, either by distending his bladder or by waiting for it to react spontaneously, it went on to its conclusion. He had no power whatever of closing his internal sphincter, though he had still that nerve supply remaining which ought to be able to bring about its closure. Furthermore, by examining the pressure within his bladder by means of a delicate cystometric apparatus, we found that he was quite unable to relax the internal sphincter once it was closed, even though the bladder were quite distended. He had to wait until a micturition occurred spontaneously. The hypogastric or presacral nerve supply to the bladder was of no use to him, either in starting or restraining micturition.

I found that this kind of micturition, "automatic micturition", following destruction of the sacral segments had been observed and described by Muller in 1902<sup>2</sup> and that his observation had been confirmed by others. Muller had further satisfied himself, by excising lengths of spinal cord in animals, that it occurred without any possible mechanism in the sacral segments or in the hypogastric nerve. Elliott<sup>3</sup> found that in animals, and therefore probably also in man, the vesical plexus, the parasympathetic ganglia near the neck of the bladder, contains the essential mechanism. Although establishing the existence of this simple automatic micturition, these investigators were not able to find why in some circumstances it fails to develop, why in many cases of spinal disease there occur permanent states of retention with overflow and what is the sphincteric mechanism which governs its appearance. With a view to gaining information on these points, I, with the as-

sistance of Dr E G Robertson<sup>2</sup> and lately Dr J M Lees, have closely investigated a number of patients with the most complete lesions of the cauda equina or conus medullaris we could find.

The circumstance which decides the onset of micturition in such patients is the reaction of the wall of the bladder to stretching caused by an increasing volume of contents. The bladder began to contract gently as soon as fluid entered it. If the distention ceased for a moment the contraction of the bladder lessened, but was renewed again as soon as distention proceeded further. The more it became distended, the more actively it contracted, so that it reached a point at which the sphincters became patent and micturition occurred. By exerting pressure through the abdominal wall it was possible to raise the pressure of the bladder to twice the value it had reached during micturition without passage of fluid through the sphincter. Passive pressure, within limits, was not capable of forcing the sphincter, whereas half the pressure, provided by a true contraction of the bladder, was sufficient to bring about micturition. Active contraction of the bladder was the requisite for relaxation of the sphincter. With a catheter just distal to the sphincter, the amount of pressure required to overcome the sphincter was found to grow less and less as the bladder filled. When the bladder had only a little fluid in it, high pressure was necessary to overcome the sphincter, as the bladder was stimulated to contract a little by partial filling, less pressure was required to overcome the sphincter, just before micturition was due to occur, only very slight pressure was required to overcome the sphincter. So whatever was the means of obstruction to the outflow of the bladder, it was something which was progressively lessening as the bladder progressively filled. Like micturition itself, it depended on contraction of the bladder, because, if one filled the bladder rapidly and produced a great deal of contraction of its wall, the sphincter became in proportion rapidly very loose. If one filled the bladder suddenly in that way and then stopped filling it so that active contraction of the bladder gradually died away and left only a mild tonic contraction then the sphincter became impassable again, although the volume of fluid in the bladder was just the same. So one might say that the degree of distention of the bladder was not the factor that brought about loosening of the sphincter but rather the amount of contraction that had been induced in the wall of the bladder. Further, it was found that with a fairly rapid degree of distention one could produce waves of contraction in the bladder and with each such wave there was a wave of lessened resistance in the sphincter. So we came

## DISCUSSION

DR J C WHITE I think in this country we have been most conversant with the work of Dr Learmonth which he put out when he was working at the Mayo Clinic. As you look back on this it has led us somewhat astray. The concept that the sympathetic nerves relaxed the bladder musculature and closed the internal sphincter (bladder filling nerves) and that the sacral parasympathetic fibres did the reverse (emptying nerves) was unfortunately a little too simple. The management of a paralyzed bladder would be much easier for us if it were true. As you look back in the literature and particularly at reports that have come out in *Bram*, you can pick up articles there by Head, Holmes, Fearnside and Foulds which contained the right idea back as far as the World War. This work which Dr Dennv Brown has described tonight is the culmination of it and draws it all together besides adding a great many new ideas and making it of the greatest value. I think he is to be congratulated on a beautiful piece of physiologic investigation.

DR GILBERT HORRAX I think it is quite beyond me to discuss this paper any more than it has been discussed already. I also came of course to learn what Dr Dennv Brown had to say about the mechanism of the bladders concerned with these neurologic lesions. From the point of view of the neurosurgeon we are interested in whether Dr Dennv Brown has any clinical applications of this work to the conditions which we see in these neurologic lesions and I wish he might possibly say a word about any such clinical applications which he has. Of course we are all faced in neurosurgery with spinal lesions or lesions of the cauda equina with this situation of the bladder which we do not perhaps know quite what to do with. There are various ways of handling the situation some people lean one way and some another. I wonder in view of what he said of one operation in this paper whether it would be warranted to try to get along with these cord bladders especially in traumatic cases and possibly even in some of the tumor cases not by the ordinary type of manual pressure on the bladder which at one time was advocated particularly during the war when we saw so many gunshot wounds but possibly by a series of manipulations which would start the bladder contractions and thus cause evacuation. I have seen some cases as no doubt others have seen of these cord lesions which have done very well with the expression of the bladder manually. On the whole I think however that neurosurgeons lean toward the indwelling catheter with possibly the method of tidal drainage as advocated by Dr Donald Munro.

I want to add my congratulations to the others on this piece of work which is certainly interesting and very valuable.

DR DAVID RIOCH I was fortunate in having been able to study in Professor Sherrington's laboratory at Oxford in 1929 but unfortunately in that Dr Dennv Brown had that year completed his work there and had left physiology to go into the field of medicine. I have been particularly interested in Dr Dennv Brown's paper as it is an excellent example of the thorough and painstaking type of analysis which has characterized the Sherringtonian school from the beginning. Thus in investigating the nervous control of the bladder his first interest has been to determine the function of the individual efferent nerves and of the intrinsic nervous mechanisms. With these data in hand he has then proceeded to investigate the more complex rôle of the various parts of the central nervous system. This approach is funda-

mental and much more sure than that used by several other investigators in this field who have started with the central nervous system and then tried to interpret their empirical data.

I am sorry Dr Dennv Brown did not like the cat as the cat is an excellent experimental animal. This brings up another interesting point in general about physiology namely that we have to study physiology not in one animal and then apply it to all others but we have to confirm every observation in every species. It has been shown that the sympathetic system is entirely different in its composition of individual types of nerves in the cat, the rabbit and the dog. I believe clinical observations show that the human system differs from those other three forms. In Dr Dennv Brown's paper we have further evidence of species differences. In the cat stimulation of the hypogastric nerves causes the body of the bladder to contract whereas stimulation of the pelvic nerves causes contraction of the trigonum.

I should like to ask Dr Dennv Brown whether he has made any observations on the afferent nerves supplying the bladder. In a few experiments we have found that rapidly emptying the distended bladder of chronic spinal cats results in a series of cardiac extrasystoles so severe as frequently to end in the death of the animal.

I should also like Dr Dennv Brown to say a few more words about his conception of the mechanism maintaining the contraction of the internal sphincter. Does he assume that the resting state is one of contraction or is there a nervous center maintaining that tone? Also does he have any observations upon the hormonal control such as adrenin in the blood stream acting upon the vesical plexus? This would be of interest since Cannon and Rosenbluth have just shown that the peripheral sympathetic neurons may be sensitized when their preganglionic fibers are cut. It would be of interest also to know whether the different nerves supplying the bladder are cholinergic or adrenergic.

DR G G SMITH I have seen a number of cases of excision of the rectum which have been followed by marked disturbances of the bladder sometimes lasting many months or permanently. Of course in that operation the sacral nerves are probably cleaned out along with the rectum and probably the hypogastric plexus also at least the presacral nerve. I would like to ask Dr Dennv Brown where the ganglia that control the action of the detrusor are situated. Are they in such a position that they also would be removed or might they be expected in time to give an automatic bladder?

DR F H COLBY Dr Dennv Brown has been very nice to come up here from New Haven on very short notice and he has given a splendid paper which we have all enjoyed very much. We are a group that is distinct from his own group and our interest is in practical application of some of these things. I would like to ask him what infection does in instances of cord bladders. Does that modify his previous remarks?

I also am very much interested in what he himself would consider the proper routine in taking care of a patient with a cord bladder. Should these patients be catheterized? Should they be put on constant drainage? Should they be put on tidal drainage? Should they be left entirely alone? Each of these opinions one can find very fervently expressed in urologic literature and it is rather confusing. The internal sphincter apparently isn't of so much account as we have thought. In the operation of total prostatectomy for instance we certainly remove the entire internal sphincter and the entire prostatic urethra and I should think the entire vesical plexus

widens and at 100-200 cc the dimple has opened out to form a small funnel. The urethra is dilating down to the level of the verumontanum. A little further distention causes the funnel to widen until eventually micturition begins, and then a narrow streak is seen to link the tip of the funnel with the bulbous urethra. When micturition is at its height, the urethra entirely relaxes so that the channel is equally wide throughout. There is no question of any mechanical obstruction to the outlet. If the inflow of fluid is stopped at say 100 cc and the vesical contraction lessens, in the x-ray films the urethra is seen to revert slowly from the funnel to the dimple stage. The fluid in the funnel regurgitates into the bladder, and the urethra closes again. If passive pressure is applied to the bladder suddenly, thus raising the vesical pressure to a high level, an x-ray film during that high peak of pressure shows no re-opening of the prostatic urethra, the dimple remains. The funnel cannot be produced by pressure alone. If the bladder is gently massaged, it begins to contract again and after a while the funnel returns. The phenomenon of this widening of the prostatic urethra requires active contraction of the detrusor and is proportional in degree to the contraction of the bladder wall.

That brought us back again to the reciprocal relationship between the active contraction of the detrusor and the sphincter, only we had to consider not the relaxation of a ring-shaped sphincter, but the relaxation of a tube. It was obvious that at low volumes the sphincter could be as tightly shut off in its proximal as in its distal part. Therefore, we were dealing with something which relaxed from above downward. It was as much a sphincter in its upper part as in its lower part. If you filled the bladder suddenly with 200 cc of radio opaque fluid and took an x-ray film, you would very likely have found a funnel-shaped dilatation of the urethra, because the bladder was still contracting. Therefore, the obstruction appears to be an active process, not a mechanical one. That brings one to suppose that we are dealing with smooth muscle. This sphincter must be something much more than the small ring-shaped muscle at the bladder neck, the internal sphincter of Henle, because it can contract so strongly all the way down. There is no possibility in its lower part for any mechanical factor. The force that the sphincter can withstand, especially in its lower part, is seen by the fact that the prostatic ducts are often distended by opaque fluid in the x-ray. If that is the case, then we have to consider that the true involuntary sphincter is a tubular muscle which relaxes from above downward by some fixed relationship between it and the detrusor muscle. That relationship appears to be the nervous

mechanism of the vesical plexus. My friend Dr. Evans has, with amplifiers, examined the nervous impulses arising from the vesical plexus in animals, and he finds that, when automatic micturition exists, each wave of contraction of the bladder is accompanied by an outburst of nervous discharge from the vesical plexus. Each outburst is distributed both to the detrusor and to the sphincter. One can only suppose that in each wave of activity nerve impulses travel down to the sphincter to relax it, just as those to the detrusor contract that muscle. It is on that elementary neurone of the vesical plexus that all central nervous impulses controlling micturition play. It is the state of depression of that neurone which determines the state of retention of urine that follows sudden damage to the spinal cord or cauda equina.

If the vesical plexus is controlled by the sacral nerves, what does the contraction of the sphincter that can be brought about by stimulation of the presacral nerve mean? There I cannot give you any direct evidence. I think there are two things that are suggestive. In the first place, the contraction produced by direct electrical stimulation of this nerve involves only the proximal part of what we have called the involuntary sphincter. The presacral nerves contract that part of the sphincter which lies just immediately below the bladder neck. Secondly, as we all know, the operation of presacral neurectomy leaves an inefficiency in ejaculation. Further, according to Macalpine,<sup>4</sup> apparently any sort of mechanical lesion or damage to the upper part of the sphincter leaves also a failure of ejaculation without interruption of micturition. It therefore seems reasonable to assume that the contraction of the upper part of the internal sphincter, long observed by physiologists to occur from stimulation of the presacral nerve, is concerned very intimately with the muscular act of ejaculation. It probably has other function as well. In any case we do not necessarily have to bring the presacral nerve into any scheme of the essential nervous mechanism of micturition.

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A CASE OF "AUTO-PROSTATECTOMY" DUE  
TO TUBERCULOSIS\*

BY THOMAS N HEPBURN, M.D.†

I AM taking the liberty of presenting this case of complete destruction of the prostate by tuberculosis and its extrusion through the urethra under the name of "auto-prostatectomy" so as to put this pathologic phenomenon in cor-



Cysto-urethrogram showing "auto prostatectomy" by tuberculosis

relation with what we have long called "auto-nephrectomy" by tuberculosis

Eight years ago I removed a tuberculous left kidney and ureter from this twenty-six year old man. At that time there was no evidence of genital infection. He was not conscious of any dis-

ability in these regions until two years ago when he returned to me and I made a diagnosis of prostatic tuberculosis. I advised general hygienic treatment. Two months ago he reported again feeling quite well but complaining of dribbling following urination. The cysto-urethrogram shows the picture here presented in which the prostatic tissue has been entirely extruded through numerous dilated ducts in the floor of the urethra, and its place is taken by a diverticulum bounded by the prostatic capsule and opening into the prostatic urethra.

Although both the external and the internal sphincters are normal, the posturinary dribbling from this prostatic cavity which is filled with urine at each urination is easily understood. As soon as this cavity has emptied, his continence is perfect.

On cystoscopic examination, this man's bladder is normal. The floor of the prostatic urethra is perforated with numerous dilated prostatic ducts varying from 1 to 5 millimeters in diameter. The verumontanum and ejaculatory ducts appear perfectly normal.

Rectal examination shows no suggestion of tuberculosis of the seminal vesicles, and there is no evidence of epididymitis.

We have here a case of tuberculous prostatitis in which the infection was carried by the urine through the prostatic ducts into the prostate with no apparent evidence of involvement of the seminal vesicles and epididymes. Furthermore, we have a pathologic process by which nature has quite successfully taken care of its own destructive products without injury to any surrounding tissues. In my own experience I have never seen this before and a casual search of the literature on genital tuberculosis has failed to reveal a report of this very happy, natural method of "autoprostectomy."

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## URETERO-URETERAL ANASTOMOSIS\*

With Report of a Case

BY C H NEUSWANGER, M.D.†

WHILE experimenting with various methods of transplanting the ureter in our laboratory in New Haven a simple technique was evolved.

This consists simply in cutting the ureter

obliquely and placing a black silk stitch in the tip of the ureter, both strands are then threaded through a large straight needle and the transplantation is effected by passing the needle through the recipient tissue. This is followed in turn by the ligature and ureter. This procedure is best illustrated by figure 1. This illustration represents uretero-ureteral anastomosis carried out in dogs.

This method was found admirably adapted

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because the seminal vesicles are removed along with the prostate yet a certain number of these individuals have normal micturition after the operation I mean they are not incontinent

DR J D BARNEY I am wholly unable to discuss Dr Denny Brown's masterly exposition on the subject, but I would like to ask a question Some years ago I was very much interested in the subject of tabetic cord bladders and carried out a lot of clinical observations We had patients with tabes who were totally unable to urinate perhaps more than a few drops some had complete retention and some had almost complete retention After proper training so-called Fraenkel exercises, we were able to re-educate these bladders so that they had good function and to a point where they had no residual urine at all This went on in many cases perfectly in definitely We do not seem to hear so much about this method as we used to, but I remember it was done with great success a good many years ago I suppose there was damage to the nerves of the bladder supply but not to the muscle After being wholly out of action for a long time they resumed function perfectly well Perhaps Dr Denny Brown can explain why that happened

DR E GRANVILLE CRABTREE I haven't anything to add except that I have been enjoying myself listening to what sound like very sound ideas

DR DENNY BROWN I am very grateful for the way you have received my contribution and to all who have made such appreciative remarks Of course there are still dozens of questions which involve this very complicated subject

First of all the external sphincter Certainly in normal man, and in cases of reflex micturition by which I mean cases of transection of the spinal cord with reflex activity of the spinal segments below the lesion, the external sphincter is closed except during micturition The activity of the detrusor appears to be the only thing that effects its opening In a normal man, with the bladder moderately distended the external sphincter cannot be induced to open unless the bladder contracts This sphincter is constantly shut and is relaxed by means of a reflex through the lumbosacral segments It reinforces the involuntary sphincter

The funnel type of relaxation of the involuntary sphincter occurs in normal man, as in cauda equina lesions but occurs very much more rapidly so that in the course of ordinary micturition, the whole cycle represents the opposite of the sudden contraction of the detrusor It is just as rapid after spinal transection There is therefore a big difference between the lesion that leaves the spinal cord active and one that destroys the sacral nerves You might say that in spinal transection the bladder appears to wait up to a point and then contracts suddenly Further more, it is true that this funnel phenomenon of Burns is more commonly encountered in states such as syphilis of the spinal cord and other nervous diseases associated with retention of urine and dribbling particularly where there is loss of tendon jerks and some loss of function of the dorsal columns of the spinal cord In these states there is a persistent partial relaxation of the urethra corresponding to persistent partial contraction of the bladder, half way between these other two I have chosen to talk about the cauda equina lesion because there is a simple transection of one particular nerve supply whereas in tabes there is a more complicated state of affairs The dorsal nerve roots are damaged and the dorsal columns are damaged and there is no sure way of estimating just how much the disturbance of function is due to each As a result of examination of a large number of neurologic conditions the one factor that does cause a persistent state midway

between automatic and reflex micturition, is damage of the dorsal columns of the spinal cord With all such cases we find this funneling In all of these stages of mild, persistent retention are associated with mild, persistent vesical contraction

Of the manner in which infection affects this process, automatic or reflex micturition can develop from states of retention in the presence of the most gross infection In other cases in the absence of any gross infection, it sometimes fails to develop efficiently Just why sometimes the mechanism survives and sometimes lapses does not appear to depend on the degree of infection of the bladder, though certainly it is affected by any pyemia The bladder then reverts to its original state of retention of urine with continued contraction of the internal sphincter

Dr Riach has asked what makes the internal sphincter contract I can only answer in terms of the anal sphincter because the vesical sphincter is very difficult to observe directly We found that in man the rectum and the anus behaved in exactly the same way as the internal sphincter of the bladder The internal anal sphincter is undergoing just the sort of change in just the same conditions as the bladder but it can be examined much more easily There it is quite obvious that, if the rectum is not contracting the internal anal sphincter is firmly closed If an apparatus is devised to distend it degree by degree from nothing up to a wide distention, it is found that its contraction is in proportion to the amount of distention If nothing is distending the sphincter it does not contract Apparently such a mechanism would explain what the vesical sphincter does It does not maintain unmeaning contraction but it has what really is an essential feature of all tonic contraction that is, a reaction to stretch Once it is stretched by any fluid tending to pass it it contracts Whether this reaction is determined by a nervous plexus or is a purely muscular phenomenon remains to be determined by physiologists An interesting point is that it seems to be the particular function of all sphincters to preserve a reaction to stretch and only active contraction of the canal above can affect them

Dr Riach also asked about chemical or hormone control, such as by adrenin or acetylcholin I am afraid I am unable to tell him anything about that except that the nervous origin of this process is suggested by the fact that not only does the automatic bladder react with discrete micturitions but if you give sudden pressure on the bladder, it contracts with an immediate extra wave of contraction The whole process appears to be too rapid for chemical stimulation It appears to be a direct nervous reaction to stretch

Dr Horrax has asked me about treatment and I am afraid, like everybody else I see cases do well under various treatments by continuous catheterization by catheterization at intervals by tidal drainage and so forth Some of these conditions seem to recover more quickly than others but just why does not seem to depend so often as it should on the way they are treated One finds contradictions right and left Again I feel that we really do not know enough about the principles underlying the vesical mechanism I am quite aware that valuable work is being done, particularly in this country on cystometry but still I feel that we have a great deal more to learn about the mechanism I think the information gradually accumulating from systematic tidal drainage and other means of following cases through from beginning to end will eventually give us much better insight into the many problems which should be settled Until then there cannot be said to be any rational basis for this or that treatment I think gentle massage of the bladder in such diseases as tabes is a sound procedure in encouraging the bladder to contract and in securing more efficient micturition

## DISCUSSION

DR G G SMITH When you put the ureter from the diseased side into the other are you not afraid it will occlude the lumen of the healthy ureter and in that way possibly destroy the function of the kidney? How do you explain the avoidance of that?

DR CLYDE DEMING I think Dr Neuswanger has given you most of the details but Dr Colby has asked if it could be done through the peritoneal cavity. It has been done retrovesically and extra peritoneally so that the peritoneum is not opened at all.

In regard to obstruction at the point of anastomosis, it seems clear that we do not get an obstruction. The one and only experimental case of that as far as the dogs were concerned was the one which Dr Neuswanger presented to you. Whether we have the correct interpretation in regard to that case I don't know but it is interesting to note that one can do this safely and without apparently any obstruction at the point of anastomosis. We hesitated

to present it to a larger body but we would like to have you talk it over and make any suggestions or criticisms you would like about such a procedure. Perhaps the physiologists could explain the reason why you don't get an obstruction at that point. Certainly in all the experimental work, there has been no definite obstruction at the point of anastomosis.

DR NEUSWANGER Dr Smith's point is well taken. At the first operation in which we transplanted one ureter into the other I thought we would surely get a hydronephrosis but the ureter simply dilates the extra lumen which is in the second ureter causes a little local dilatation and it apparently doesn't take much room for the urine to get by. I have one animal which Dr Deming has made me keep. This is her third year but I expect to autopsy her some of these days and I don't believe she will show any hydronephrosis. Unfortunately, it is difficult to get an x-ray of these animals without killing them. You cannot possibly catheterize these ureters and if you inject intravenous skiodan you don't get satisfactory pictures.

THE IMMEDIATE EFFECT OF PREOPERATIVE RADIATION  
IN CORTICAL TUMORS OF THE KIDNEY\*

BY GEORGE C PRATHER, M D,<sup>†</sup> AND HARRY F FRIEDMAN, M D<sup>†</sup>

STATISTICS from various clinics indicate that the outlook for patients with malignant tumors of the renal cortex has not been a pleasant one. There has been a high operative mortality with only a small percentage of five-year cures in the group which has survived nephrectomy.

Hyman<sup>1</sup> reported a group of 5 to 10 per cent that were not operated on because of the extent of the tumor or because of metastases. Judd and Hand,<sup>2</sup> reporting in 1929, showed that only 10 per cent of their patients with renal tumor had survived nephrectomy for ten years. Smith<sup>3</sup> found of those who survived operation that 47 per cent of those with hypernephromas and 77 per cent of those with adenocarcinomas died of a recurrence. He reported a 25 per cent survival of his cases without evidence of recurrence for a period varying from one to ten years. Smith and Shoemaker<sup>4</sup> in a previous report found of those who had nephrectomy that nearly 50 per cent were dead within one year. In children the outlook appears to be even worse. Statistics collected by Wharton<sup>5</sup> indicate that 90 per cent of the children with renal tumors have died within one year after operation.

Operative mortality is influenced to some extent by the enthusiasm of the surgeon as well as by his skill. There has been a group of large tumors on which most men would refuse to operate. Others would make the attempt obtain a microscopic diagnosis and back out while the more daring soul would proceed to remove the

tumor with an immediate mortality. In a series of nineteen cases which Smith and Shoemaker explored but in which they could not do nephrectomy only two patients lived more than a year. Thus the operative mortality can be high or low without significance, except for the pertinent fact that, in the group which have had nephrectomy in the past, there has been an operative mortality of 15 to 30 per cent. In his own series of forty cases Smith found an operative mortality of 17.5 per cent. Wharton has found that the reports of Swan, Hunt and Wollstein indicate that between 12 and 26 per cent have had only exploratory operations, due to the extensive pathology present.

To summarize briefly, the literature demonstrates that about 5 per cent of these tumors are too extensive when first seen to warrant surgical consideration. Another 12 to 26 per cent have been explored and found inoperable. Of those who have been nephrectomized 15 to 30 per cent die as the result of operation. Therefore, between 35 and 60 per cent of all patients who have been seen with renal tumor have never reached a place in any program of therapy which would give them a chance of a materially extended survival.

Even though Mintz<sup>6</sup> reported four cases which survived an average of eight years after diagnosis before nephrectomy or autopsy was done the average natural history of these tumors probably covers a much shorter period of time. Walker<sup>7</sup> reports E Garceau as stating that in thirty-two cases the average interval between the first symptom and the fatal issue was three and one-half years. In twenty-eight cases reported by Smith and Shoemaker in which the kidney was not removed the average duration

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for repairing a cut ureter and for uretero-ureteral anastomosis

Following the use of this method on thirty-two animals over a period of four years with good results, it was used on a clinical case which I shall report

Uretero-ureteral anastomosis has been considered in the past as surgical gymnastic and dismissed chiefly because of the danger of stricture formation To my knowledge the case

done under an anesthetic and the tumor in the ureteral orifice was fulgurated deeply Following this, a course of x ray treatment was given On December 11 a complete cystoscopy showed both kidneys to be normal, but there was a recurrence of the tumors with extension into the lower 2 centimeters of the left ureter

Operation was done on December 18, 1935, at which time the left ureter was transplanted into the right by the same method as described above The stump of the left ureter together with a portion of the bladder bearing the tumors was removed Convales-

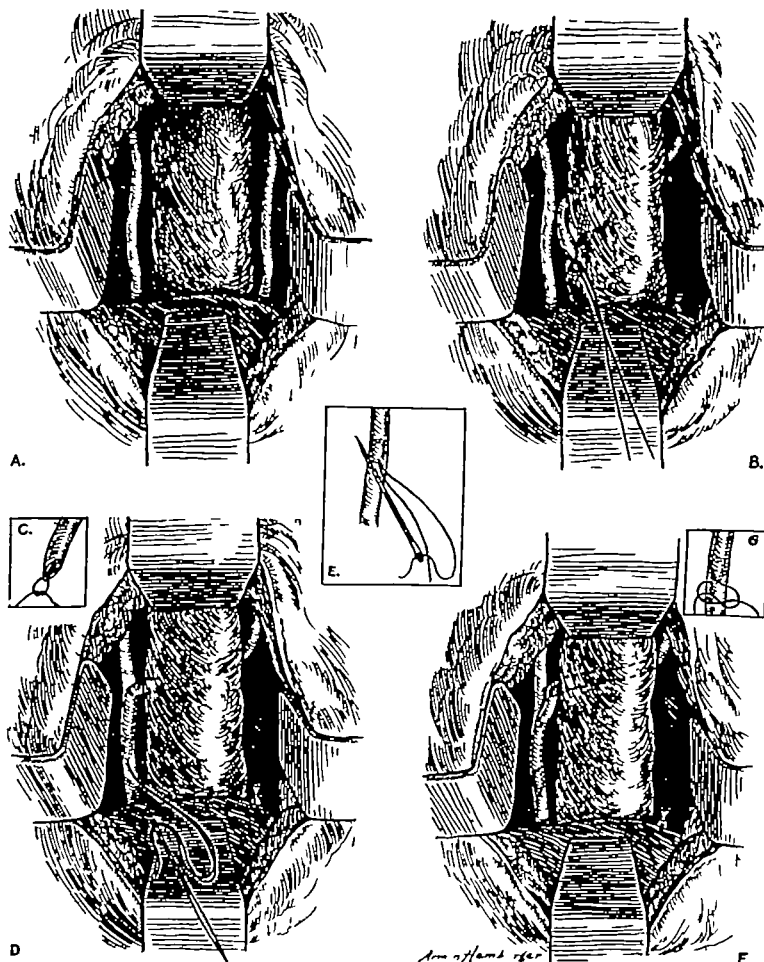


FIGURE 1

here presented is the second one reported on man, the other being an end-to side anastomosis

CASE J K a male thirty-six years old had complained of blood in the urine for three and one-half years The patient was seen by a doctor in February, 1935, who fulgurated three papillomas about the left ureteral opening March 7 1935 he was examined at the New Haven Hospital and found to have three papillomas one emerging from the left ureteral opening one to the left of the opening and one on the left of the ureteral ridge Biopsy was done and the tissues fulgurated Fulguration was repeated on March 28, 1935 and, on July 25, 1935 all three tumors had recurred and fulguration was again done On August 9 1935 fulguration was

cence was uneventful There was no leakage of urine at any time Three months later intravenous urography showed the kidneys and ureter to be unchanged and an anastomosis functioning normally

#### CONCLUSIONS

This method of transplantation avoids to a large extent the danger of peritonitis and subsequent infection of the kidneys In selected cases where there is need of transplantation of one ureter this method may prove of value if our clinical results prove as satisfactory as those obtained in animals

gens The posterior field was increased to 400 square centimeters which necessitated decreasing the amount of irradiation to this field

Two of our four patients remained in the hospital the first week of their treatment and then called daily for their treatment The other two were ambulatory patients from the beginning of treatment All four patients had some nausea and vomiting during the course of their treatment but this was not sufficient for them to be called miserable They did not lose weight The white blood count did not go below 6000 None of them were transfused during the course of irradiation or before surgery They all gained appreciably in general health between the conclusion of irradiation and date of nephrectomy a period which varied between ten and thirty days A definite tanning of the skin took place in the three renal cases In none of these four patients was there any delay in healing of the nephrectomy wound They all had a normal convalescence There was no noticeable perirenal fibrosis or difficulty with adhesions at the time of operation

By frequent observation of these patients during their irradiation treatment we have gained the impression that decrease in size of the tumor began about the third week of treatment and that the tumor had not started to enlarge again at the time of operation Furthermore, the general condition of the patient began to show rapid improvement two to three weeks after the conclusion of irradiation treatment We believe, therefore, that an interval of at least three to four weeks between the conclusion of irradiation and nephrectomy is probably desirable

Just what the optimum dose of irradiation is for this type of tumor and what the optimum interval should be between the conclusion of the irradiation program and the nephrectomy has not been finally determined

The immediate effect of preoperative radiation will be of value if it will reduce the size of the tumor to permit a safer and easier nephrectomy

#### CASE REPORTS

CASE 1 F G Male—aged 3½ years The patient seen July 10 1934

Two weeks previously his mother had noticed a lump in the right flank. A doctor was called and advised immediate surgical consultation A general surgeon operated that night found a solid retroperitoneal tumor and obtained a biopsy Biopsy report—Wilms tumor Further surgical consultation offered the family no hope

P E Slender boy pale. Abdomen showed a mass in the right flank extending past the midline anteriorly from the false pelvis to the diaphragm The abdominal incision had healed. One stitch was still in place The urine was negative

Diagnosis Wilms tumor of the right kidney

Radiation was given by Dr Friedman between July 11 and August 6 1934 inclusive consisting of

20 high voltage x ray treatments in doses of 200 r, for a total of 4000 r units

An intravenous pyelogram was made August 26, 1934 (fig 1)

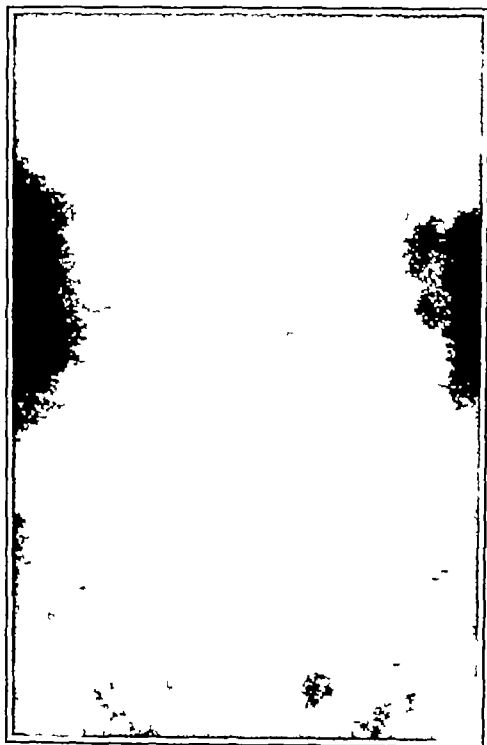


FIG 1

F G Case 1 Right Wilms tumor Intravenous pyelogram still showing some distortion of right kidney following 4000 r units preoperative radiation There has been a remarkable reduction in size due to radiation

An extraperitoneal nephrectomy was done August 29 1934 The tumor had receded to where it was barely palpable on physical examination (fig 2)

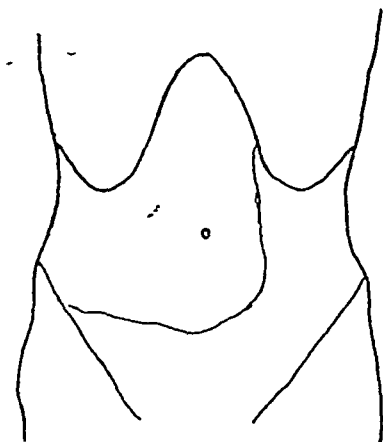


FIG 2

F G Case 1  
Solid line—pre-radiation estimate as to size of tumor  
Dotted line—post-radiation estimate as to size of tumor

Nephrectomy was accomplished easily except on the peritoneal surface through which the biopsy incision had been done The convalescence was uneventful



of life after the first symptom was less than two years in twenty-five cases

The important factor, that contributes to these failures, exclusive of the potent fact that we are dealing with cancer, is the size of the tumor. It balks our surgical efforts—first, by prohibiting surgery in some, secondly, by discouraging nephrectomy in others and thirdly, by proving surgery insufficient to cure in many instances when nephrectomy has been accomplished.

It has, therefore, been of the greatest interest to hear of the encouraging reports of Waters,<sup>8</sup> Bothe,<sup>9</sup> and Wharton,<sup>6</sup> in the use of the Coutard type of preoperative irradiation to reduce the size of these tumors. Their clinical and histologic studies show that many tumors of the renal cortex will diminish in size in a spectacular manner. This has held true apparently in tumors composed of embryonal, poorly differentiated cells which lack a tough membrane. Bothe reports reduction in size of 40 to 50 per cent in two mixed tumors of the kidney which he irradiated. The series of fifteen cases reported by Waters, Lewis and Frontz<sup>10</sup> has shown 93 per cent radiosensitivity. Wharton reports two Grawitz hypernephromas and two Wilms' embryomas which decreased in size almost miraculously. To this group I can add one Wilms' tumor and two hypernephromas which were definitely reduced in size by preoperative irradiation (cases 1, 2 and 3). A fourth case, carcinoma simplex of the adrenal (case 4), did not appear to be influenced. In the small number of cases reported to date, therefore, we have reason to be pleased with this method of temporarily reducing the size of cortical tumors of the kidney.

Microscopic examination of the specimens which have been irradiated shows necrosis as a constant finding. Necrosis, however, is found in many large nonirradiated tumors. Some fibrosis is evident. Waters reports thickening of the capsule which we are unable to observe, while Bothe mentions in the Wilms' type of tumor which he studied that irradiation had a definitely destructive effect upon the embryonal connective tissue cells, but little or no effect upon the better differentiated epithelial cells.

After careful microscopic study of the four cases reported here we agree that, while irradiation seems to produce definite gross and microscopic changes in these tumors, it does not cause a cure. Bothe reported three children who so improved under irradiation treatment that their parents would not permit surgery. Two of the three were dead within a year.

The technic used in these cases has necessarily varied on account of the different types of tumors and the extent of the tumors as revealed by palpation and pyelogram. We have attempted

in all cases to give what we considered the maximum amount of irradiation that these patients would stand, realizing that the lethal roentgen dose for hypernephroma is probably prohibitive. In the case of the Wilms' tumor (case 1) we felt that we might be able to destroy it by the dosage given, and, as judged from the post operative histologic evidence, we came very near attaining our purpose. The technic used in this case consisted of the following factors: 200 K. V pulsating, 4 milliamperes of tube current, 75 millimeter copper and 1 millimeter aluminum filter, 50 centimeters tube distance, wave length effective 0.16 Å units, quantity 10.5 roentgens per minute, field 150 square centimeters, 4000 roentgens total dose, 200 roentgens daily dose for 20 days, alternating front and back over the mass. This dose was repeated to the kidney bed following operation. The amount of radiation given in this case is, we feel, the low limit for a Wilms' tumor and should be increased in those cases that can tolerate it. This little patient was too poor an irradiation risk to attempt a larger dose, although the response was most gratifying. The tumor could not be made out on palpation and appeared only as a walnut-sized mass in the pyelogram.

Case 3 presented a huge mass in the right side of the abdomen and the typical roentgen findings of a cortical tumor. The lethal dose for a hypernephroma, in so far as we are aware, has never been determined. We have given as high as 9000 roentgens directly into the mass through three fields of 180 square centimeters, anterior, posterior and lateral. This has produced a destruction of the germinal layer of the skin with denudation of the dermis. In the microscopic examination of this tumor one was able to distinguish live tumor cells. There was considerable fibrosis and a great deal of necrosis. No intestinal symptoms were noted in any of our cases. The blood remained unchanged and the skin returned to its normal texture in two weeks. Two weeks following the irradiation the tumor had decreased to half its size to be followed by an increase for a period of ten days. We wish to call particular attention to this phenomenon which apparently is due to edema caused by the irradiation. The mass just before operation was about one-third of its original size. In the treatment of this case the following factors were used: 200 K. V pulsating, 4 milliamperes of tube current, 2 millimeter copper and 1 millimeter aluminum filter, 50 centimeters tube distance, wave length effective 0.12 Å units, quantity 3.5 roentgens per minute, 3 fields of 180 square centimeters anterior, posterior and lateral, 3000 roentgens to each field, daily dose 200 roentgens to each of two fields morning and afternoon, total dose 9000 roentgens.

Case 2 was treated in the same manner as the case above the total dose being 6000 roent-

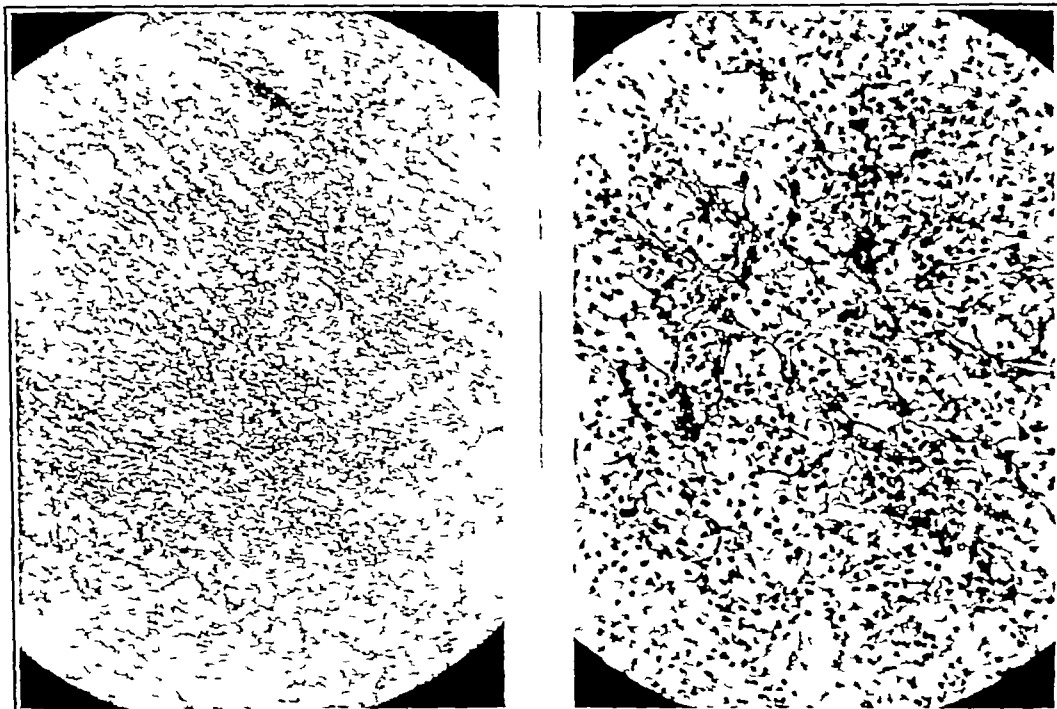
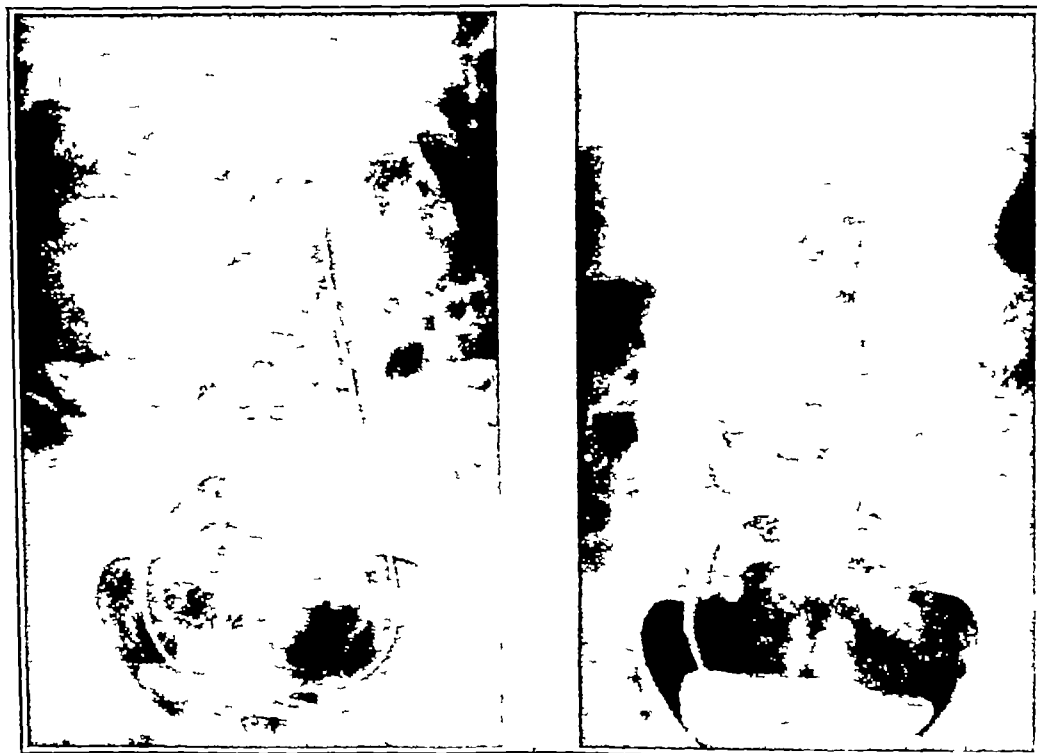


FIG 6

*E C Case 2* Hypernephroma following 6000 r units radiation. There are large cells with cytoplasm peculiarly clear so that it has a foamy appearance. Cells are arranged in cords for the most part. There is a loose connective tissue. Glomeruli and tubules appear in good condition. Very little histologic effect from radiation.



A

B

FIG 7

*A. P Case 3* Right hypernephroma.

A. Right pyelogram before beginning radiation.

B. Right pyelogram three weeks following 4000 r units preoperative radiation.

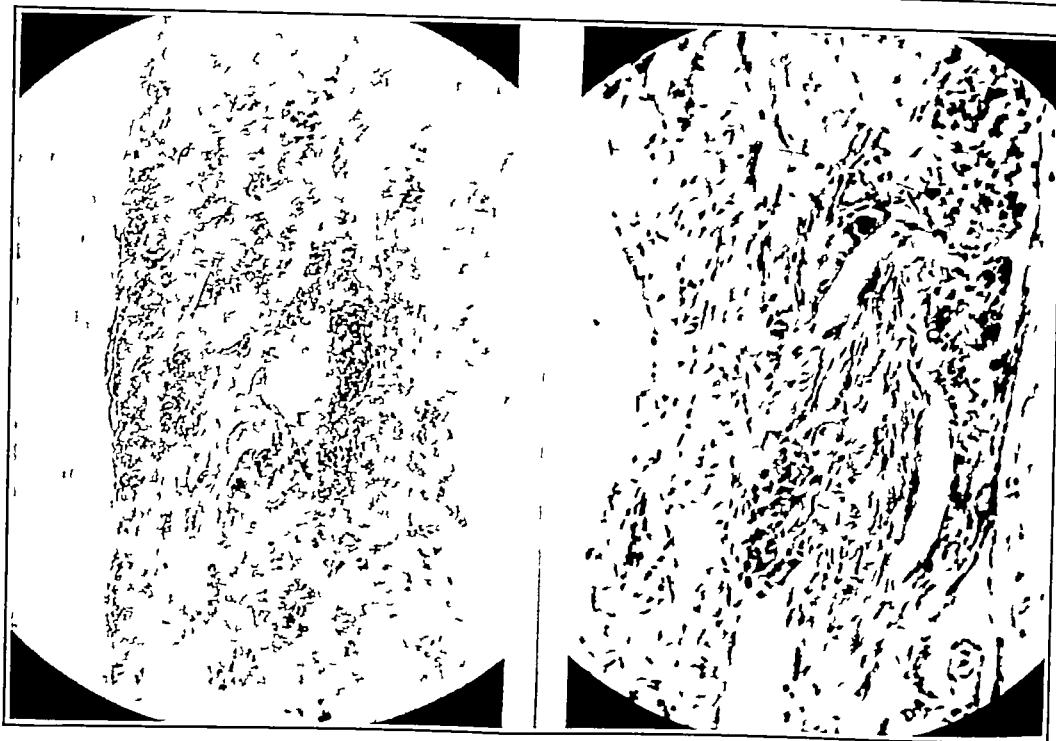


FIG 3

*F G Case 1* Wilms tumor following 4000 r' units radiation. The original tissue of the tumor is destroyed and fibrosed and there are only occasional islands of cells which look like

epithelial cells. Enclosed by a thick fibrous capsule is a very vascular fibrous tissue tumor. There is no inflammatory reaction.

The pathologic report on the kidney finally removed was "Fibrosed tumor of the kidney (fig 3) possibly Wilms' tumor."

In October 1934 the patient had 4000 r' units as a postoperative measure, making daily visits to the office of Dr. Friedman. It is now nearly two years since the operation and there is no evidence of recurrence or metastasis.

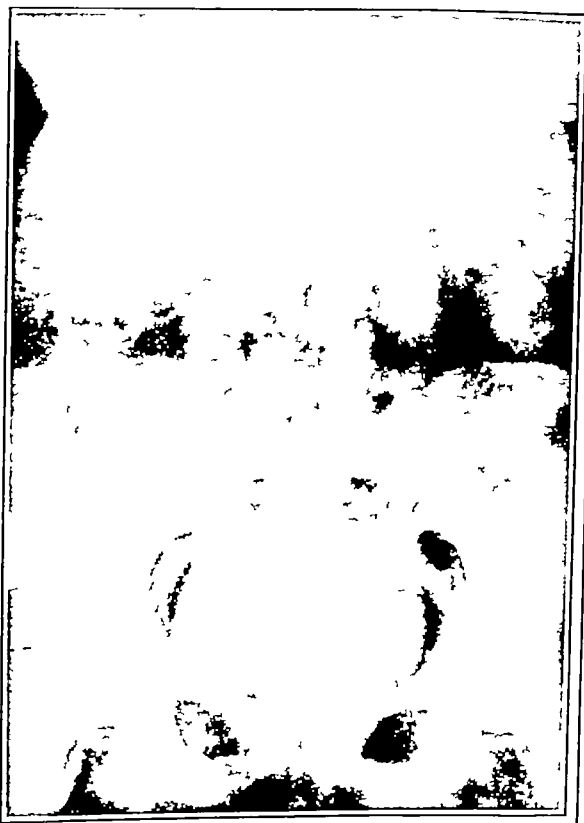


FIG 4

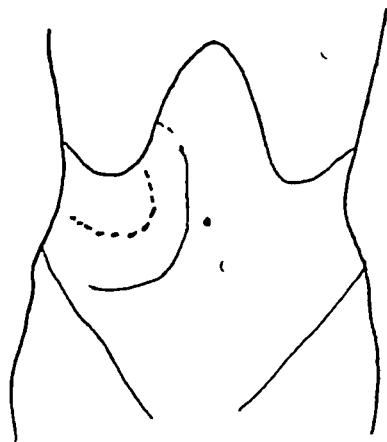


FIG 5

*R C Case 2*

Solid line—preradiation estimate as to size of tumor  
Dotted line—postradiation estimate as to size of tumor

**CASE 2** R C Female—aged 50 years. On September 8 1935 the patient developed gross hematuria. The following day she had sudden acute pain in the right costovertebral region radiating to the right lower quadrant.

P E Her blood pressure was 160/100. A tumor in the right upper quadrant the size of

CASE 3 A F Female—aged 52 years The patient complained of hematuria with right colicky pain, radiating from right back to epigastrium, of one week's duration

She had had kidney trouble as a child while in Russia and was 'swollen all over' and was in the hospital three weeks

P E A large mass was found in the right upper quadrant, the right flank and the epigastrium

A pyelogram demonstrated a hypernephroma (fig 7)



FIG 11

F R Case 4 Right pyelogram of adrenal tumor with some distortion upper calyx of kidney Kidney pushed downward slightly Increased density above the kidney with diffuse calcification in the adrenal tumor

X-ray treatment was begun December 12 1935 and was concluded January 13 1936—a total of 9000 r units being given

On January 14 1936 there was some erythema with vesiculation and the patient remained one week in the hospital for vaseline dressings

On January 30 1936 the skin was in good condition

On February 8 1936 a definite reduction in size of the mass was found (fig 8)

On February 12, 1936 transperitoneal nephrectomy was done without difficulty ligating the pedicle before isolating the tumor (fig 9)

The pathological report was hypernephroma (fig 10)

The convalescence was normal

Two months later there was a definite gain in

weight and strength with no evidence of recurrence or metastases reported

CASE 4 F R Female—aged 20 years This patient was a twenty year old girl who had had amenorrhea for seven years At the same time she had developed hypertrichosis and her voice had become definitely masculine in character The late Dr Delbert Jackson had explored her pelvis six years ago and had found polycystic ovaries with thickened, tough capsules Various ovarian extracts had been tried without effect Two years ago there was a slight rise in blood pressure ranging between 140 and 150 systolic This raised the question of adrenal hyperplasia

The patient was first seen by Dr Prather for Dr Charles Lawrence in the summer of 1934 Intra venous pyelography was done There was nothing



FIG 12

F R Case 4 Adrenal tumor with upper pole of right kidney No change in size following 3000 r units of radiation

to be felt in the abdomen The urine was negative and the physical examination disclosed the changes previously described There were no changes in the labia or clitoris Pyelograms indicated a mass above the right kidney Adrenal tumor was suspected but with symptoms of such long standing it seemed wise to wait and repeat the pyelographic study

The pyelogram was made in March 1935 and showed the same x-ray findings as on previous intravenous pyelography (fig 11) It seemed probable that this patient did have an adrenal tumor, the type of which was unknown She, therefore, finished her school year and had 3000 r units of preoperative radiation at Dr Sidney Morrison's office At no time was there any palpable mass in the abdomen or right costal region

The pyelograms were repeated immediately before operation and showed no change in the size or appearance of the suprarenal mass A chest plate was negative Three weeks after completing her preoperative radiation surgery was done on July 25 1935 finding an encapsulated adrenal tumor attached to the upper pole of the right kidney Both organs were removed (fig 12) The pathological report was carcinoma simplex of the adrenal Normal kidney (fig 13)

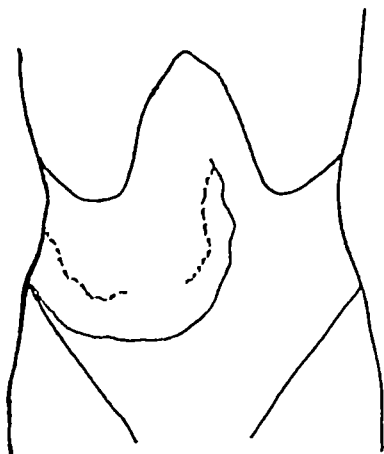


FIG 8

A F Case 3

Solid line—preradiation estimate as to size of tumor  
Dotted line—postradiation estimate as to size of tumor

mass was irregular and moved very little with respiration

Laboratory notes Urine—s t. albumin no sugar, sediment loaded with red blood cells with occasional white blood cells Blood, nonprotein nitrogen, 29 Wassermann negative

An intravenous pyelogram was done September 11 and showed a right hypernephroma (fig 4)

X ray treatment was started Daily treatments and hospitalization during the next fourteen days, following which time she continued having x ray treat-



FIG 9

A F Case 3 Gross specimen of hypernephroma of the right kidney after 2000 r units radiation

ments at the office of Dr Friedman Radiation was finished October 1 The patient had 6000 'r' units through three portals

Transperitoneal nephrectomy was done October 10, 1935, by Dr E G Crabtree who thought the tumor was smaller than previous to x ray (fig 5) The postoperative convalescence was uneventful

Pathologic report was hypernephroma (fig 6)

A follow up four months later showed no evidence of recurrence

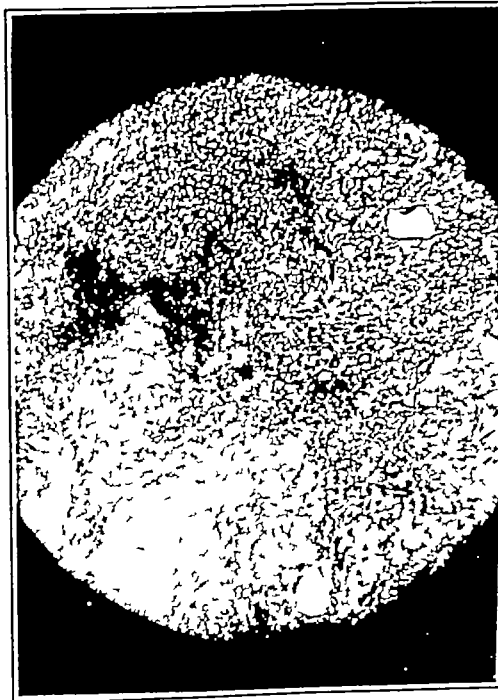


FIG 10

A F Case 3 The tumor was mostly on upper pole  
Slide 8—only a slight suggestion of normal kidney tissue seen  
Through all sections is a marked scattering of atypical cells  
Cells are large with a fairly definite cellular membrane These cells tend to form cord like masses In many areas there has been marked degeneration within this tumor tissue and much hemorrhage is noted Hypernephroma of kidney (with necrosis)

striking difference clinically and pathologically between the Wilms tumor and the adult tumor of the parenchyma of the kidney. Dr. Prather refers to them as cortical tumors and then as parenchymal tumors. I am not quite sure that he wishes to convey the impression that he can separate clinically the tumors of the cortex and the tumors of the parenchyma. We have had experience with a group of cases of Wilms tumor treated by radiation by the so-called Coutard technic. Whether we all really use the Coutard technic I am very doubtful but at any rate it is certainly a much more effective method than the earlier method. All of the cases of Wilms tumor showed very striking shrinkage. All but one were converted from an apparently inoperable type to an operable type. One of them, a very massive tumor changed but little in size but became practically completely calcified and ten months after exploration apparently is precisely the same. It feels calcified and the x-ray film shows calcification or at least some process which interrupts the passage of the rays in almost the complete outline of the tumor. It was so intimately associated with the under surface of the liver that it seemed to me impossible to remove it. It had not shrunk very much but its activity had apparently been very much diminished. All the other cases correspond very closely to what Dr. Prather suggests going from an inoperable state to a very readily operable one.

I think the most striking case is a recent one. A patient came to us after having had at the hands of a radiologist an allegedly 'complete course of radiation for a tumor that crossed the midline and perhaps occupied three-fifths of the abdomen. Under further radiation it shrunk so that at the time of its removal it was about the size of a cricket ball. Hence I am not sure that one needs to take seriously the allegation of previous complete radiation.

At least one is, I think, permitted in these cases which have not shrunk and which are Wilms tumors to try a little more x-ray, carried out by people with whose technic you are entirely familiar.

In the group of tumors of the parenchyma, commonly referred to as the hypernephromas (I do not like the word because I do not like its implication), the shrinkage is less striking. In nearly half the cases we have been unable to say that there was any certain change in the tumor as one examined it.

There was one case that we were certain was inoperable but, as some of the colon became involved, an obstruction resulted. We sidetracked the colon did a lateral anastomosis, then treated him as effectively as we could and referred him to a radiologist near his home. The patient was an old Frenchman. That was four and one-half years ago. Every Christmas he sends me a card. The growth has apparently been arrested. Unfortunately it was so obviously inoperable and so obviously very malignant that I did not even take a piece of it, so I have no knowledge as to its pathology.

Let me issue a warning in regard to Wilms' tumor. If you undertake to predict how long after x-ray this tumor will have shrunk to its minimum size and tell the patient to return home and come back to you on a certain day, you may easily be wrong. These patients must be under continuous observation. We have one case that we did not keep under close observation. The shrinkage was rapid and we allowed the child to go home for three weeks to let the shrinkage continue. When he came back the tumor had begun to increase in size and the second series of x-ray treatments were less successful. When you start x-ray treatment and propose to follow it by operation keep the patient constantly under observation so that you may remove the tumor at what seems to you the time when it is as small as it is going to be.

## BLADDER DIVERTICULA WITH REIMPLANTATION OF THE URETER\*

BY CLINTON N. PETERS, M.D.†

**D**IVERTICULA of the bladder may be classified among the more unusual urological conditions. The etiology of the condition is not entirely plain but we find the cases occurring chiefly in the male sex. There is no question but that bladder neck obstruction and intravesical pressure are the fundamental principles involved in the formation of diverticula and there may also well be in certain cases, a congenital weakness of the bladder structure which may predispose it to the formation of the condition.

Pathology starts with a hypertrophy of the muscle fibers of the bladder in an initial effort to overcome bladder neck obstruction. Secondly there is a separation of these fibers with a hernia of the mucous membrane through the bladder wall resulting in the formation of a sac of varying size. The sac contains no muscle fibers and does not empty at micturition. In the course of the progress of the diver-

ticulum the sac enlarges may become infected and adherent to the underlying structures and may contain calculi or become malignant. The most common position for the formation of diverticula is at the weaker portion of the bladder wall where the ureters enter and at the urachus which may have failed to close entirely. The number of such diverticula varies greatly. It is not uncommon to encounter several large and a varying number of small sacs in the same patient. Occasionally, when a diverticulum is situated at the site where the ureter enters the bladder, the ureteral opening is gradually pulled into the sac in the process of enlargement and we have, as a complication of the condition the ureter entering at the bottom of the diverticulum. Where this condition occurs pressure from the diverticulum upon the ureter or adhesions from the sac may cause partial obstruction with resulting hydronephrosis of the kidney on that side. Relief of the underlying causes of diverticula such as stricture, bladder neck obstruction and prostatic hypertrophy, does not in any way tend to cure the condition, and surgery must be resorted to.

Read before the New England Branch of the American Urological Association Boston April 23 1936

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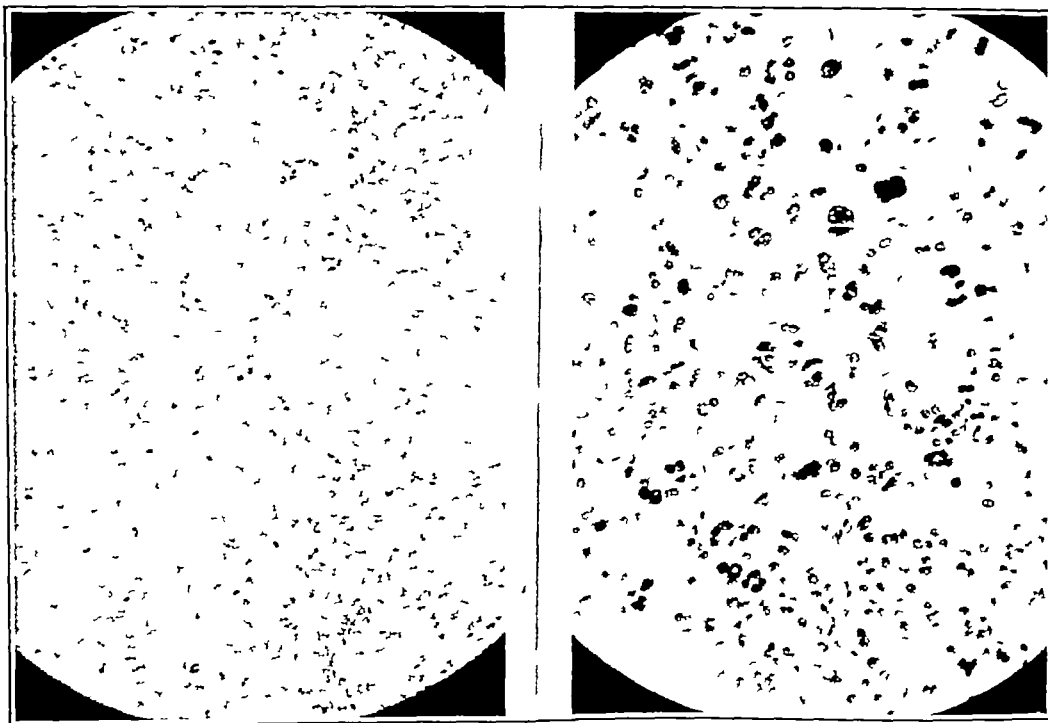


FIG 13

*P. R. Case 4* Adrenal tumor following 3000 r units radiation. Carcinoma simplex of adrenal. Tumor mass shows capsule composed of fibrous tissue in which are present streaks of columns of cells with round nuclei and pale cytoplasm resembling adrenal cortical cells. Some of the nuclei are of huge dimension many cells have many nuclei. The cytoplasm is abundant and of a pale eosin staining type. The stroma is slight composed in general of many capillaries separating single and groups of tumor cells.

The convalescence was uneventful. Adrenal cortex hormone was on hand and was used routinely for three days by Dr Lawrence.

The patient was discharged three weeks after operation.

Her periods reappeared in September, 1935 after an absence of catamenia of seven years duration.

Her family and Dr Charles Lawrence believe the pitch of her voice has become raised. There is no change in the rate of growth of facial or abdominal hair.

#### SUMMARY

- 1 About 5 per cent of renal cortex tumors have been too extensive when first seen to warrant surgery.
- 2 Twelve to 26 per cent have been explored and found inoperable.
- 3 Nephrectomy has shown a mortality rate between 15 and 30 per cent.
- 4 With exceptions, the average natural life history of these tumors is two to three and one half years.
- 5 Reports indicate that preoperative radiation will reduce the size of these tumors.
- 6 Three cases of renal cortex tumors are reported in which preoperative radiation has reduced the size of the tumor.

7 One case of adrenal tumor is reported which was apparently not influenced by preoperative radiation.

8 The immediate effect of reducing the size of the tumor and permitting easier nephrectomy may be a factor in improving the five-year results.

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#### DISCUSSION

DR HUGH CABOT. We have had a number of cases similar to those Dr Prather presents. There is a

cases clinically proffered as being of virus etiology. In cases where the clinical evidence favors infection with a nonbacterial agent, the pathologic reactions found in the nervous system might be considered to fall into four principal groups.

The first group is composed of cases which are notable in that the findings are essentially negative, typified particularly in conditions classified as Landry's paralysis without definite evidence of myelitis.<sup>10 10</sup> The etiology of this group remains obscure except for the apparent bacterial sterility of the nervous tissue in a considerable number of the cases studied.

The second group is comprised of cases which present a response similar to that occurring in association with or following certain known virus diseases or vaccination, as manifest the postinfective and the postvaccinal encephalitis.<sup>16 22 50 52 74 75 80</sup> The most striking histopathologic feature common to the group is perivascular demyelination. There is no sure evidence concerning the precise etiology of such conditions. Some investigators have suggested the effect as being produced by the virus of the initiatory infection or by the activation of a pre-existing neurotropic virus, others, that the causation lies in an allergic response. It is of interest to note that Rivers and his co worker<sup>1</sup> have produced demyelination in monkeys by the repeated intramuscular injection of aqueous emulsions and alcohol-ether extracts of fresh sterile, normal rabbit brain. The condition so produced was not transmissible to other monkeys.

The third group is composed of cases, in which the lesions are not characteristic of a particular virus, but rather may be induced by a number of different viruses. Such a picture is presented by cases where the reaction is characterized by a variable degree of degeneration, necrosis and proliferation of the neural elements, together with a secondary infiltration of mononuclear cells, predominant in the Virchow-Robin's spaces. This type of pathologic response is exemplified in the similarity of the lesions noted in the nervous system in both the Japanese<sup>55</sup> and the St. Louis<sup>42</sup> epidemics of encephalitis, despite the dissimilarity of the specific causative viruses.<sup>46 82 83 84 85</sup> Furthermore, the pathologic findings in the foregoing neurotropic virus diseases are usually impossible to differentiate from those of von Economo's disease where the etiology is unknown.<sup>15 16 26 27 41 43 44 55 83</sup> Mention should be made of cases where, in similar reactions, there is revealed, as an additional feature, the presence of intranuclear inclusions of a type occurring in diseases produced by certain different viruses. Dawson's case of lethargic encephalitis<sup>12</sup> illustrates the foregoing response, in his photographs, the in-

clusions resemble those of experimental meningitis or encephalitis induced with the viruses, herpes simplex (in rabbits and *Cebus monkeys*)<sup>18 58</sup> "B" (in rabbits and *Macacus rhesus monkeys*)<sup>61 63 66</sup> that of salivary gland disease of guinea pigs,<sup>24</sup> of mice<sup>35 36 78</sup> or of rats<sup>35 36</sup> and many others. In cases of this type it is obvious from the preceding remarks that a specific diagnosis from the pathologic findings alone is impossible although the changes would be considered indicative of the presence of a virus by the majority of neuropathologists.

The fourth group consists of cases which can be conclusively diagnosed by the pathologic findings. In such instances the response so far as is known is effected only by a specific virus. Rabies caused by "street virus" exemplifies this type of distinctive histopathologic reaction.<sup>53 54 55</sup>

In considering the specificity of certain pathologic responses, problems connected with intracellular inclusions are of interest.<sup>7 9 87</sup> Aside from virus diseases of the nervous system where a distinctive histopathologic type of inclusion body serves as an index for accurately diagnosing the specific etiology, as is exemplified in rabies<sup>53 54 55 67</sup> and in Borna disease,<sup>47 89</sup> some inclusion-bearing cells, as has been previously noted may be encountered which are not particularly characteristic for any one virus. In addition to this difficulty, some intracellular inclusions may be confused with and sometimes be impossible to differentiate from certain normal and abnormal intracellular elements of analogous structure. Of such a classification are intracellular alterations due to the injection of hypertonic glucose and certain other solutions,<sup>38 39 86</sup> postmortem decomposition and imperfect fixation,<sup>11</sup> degenerative changes, especially of the oxychromatic type,<sup>40</sup> plasmosomes,<sup>8</sup> normal granules, the masses described by Scharer and Gaupp<sup>68</sup> in the nuclei supraopticus and paraventricularis and accumulations of lipoid<sup>23</sup> and other substances.

Attention is now directed to biologic problems related to the isolation and the identification of viruses capable of attacking cells of the nervous system. The primary difficulty in some of these affections is obtaining specimens suitable for experimentation from the living individual. Illustrative of this point are diseases with no significant systemic phase, where the etiologic agent is transferred directly from the portal of entry to the brain and the cord by the local nerves. The strict neurotropic viruses, those of poliomyelitis,<sup>6 27</sup> rabies<sup>26 27</sup> and Borna disease,<sup>47 89</sup> exemplify this mode of penetration. Such viruses attack the nerve cells directly, multiply therein and bring about necrosis. In conditions of this type, the portal of entry is the most likely site from which to secure material for experimental study. The time at which the



Surgery of these conditions is of a comparatively recent date. The first case reported was approached extravesically and was done about 1896. In 1902 or 1903 Young reported the first case approached from an intravesical incision. Up to 1915 the number of successfully operated cases was very small. At the present day, the choice of surgical procedure is the operation which Young has so well outlined, and the usual method is to invert the sac and excise it completely.

I report here two cases of multiple bladder diverticula. One was a man, thirty-six years old, with a definite stricture as the underlying cause. There were three large diverticula, one on each side where the ureters enter the bladder and the third in the region of the urachus. In this case the ureters were not involved and the surgical procedure was carried out with very little difficulty. The results, as you see from the cystogram one year later, were all that could be desired. In the second case, the man was fifty-six years of age and there was no definite bladder neck obstruction that could be demonstrated. Two large diverticula, the one on the left having the ureter enter at the base of the sac, were successfully

removed. The left ureter was reimplanted at the site of the excision. The final result, as you can see by the cystogram, is fairly good, although there still exists some hydronephrosis. What the end-result will be of course will depend on whether we have any stricture of the ureter at the site of reimplantation.

In approaching these cases surgically, I have found that suction with glass tubes about the size of the opening of the diverticulum is a great aid in everting the sac. Where a sac is particularly adherent and it is impossible to completely evert it, usually a line of cleavage of the mucous membrane can be established and complete removal of the membrane with freshening of the edges and double suture of the bladder wall and mucous membrane suffices to give an excellent surgical result. Packing the sac of a diverticulum with gauze and approaching extravesically may, in certain cases, aid in bringing about a successful inversion. But, where the sac is situated posteriorly, this is often impossible and, in these cases, the fibrous wall that is usually adherent to the underlying structures is not disturbed and simple removal of the mucous lining and suture of the opening is all that is necessary.

## VIRUS PROBLEMS IN DISEASES OF THE NERVOUS SYSTEM\*

BY JUANITA THOMPSON, M.D.†

THE literature of the present day is mute evidence of the interest taken in virus diseases involving the nervous system. One notes frequently a wide divergence among investigators in their interpretation of similar experimental and clinical results. Due to this lack of unanimity of opinion, it should be with a critical and conservative attitude that both the clinical and the laboratory worker approach neurotropic virus problems. A keen realization of the desirability of such a viewpoint prompted the present discussion.

Just as, a few years ago, clinicians were prone to explain many obscure maladies by a vitamin insufficiency, so, at the present time, a similar situation would seem to prevail with virus diseases as the chief offender. This is apparent in a tendency among neurologists to attribute to infection with an unknown virus the etiology of certain neurologic conditions where the clinical findings are not definitely analogous to any conventional syndrome known to be affected by a neurotropic virus. While some of these affections may be induced by a virus, such an etiologic factor should be considered only after

every other possibility has been excluded. Undoubtedly, repeated bacteriologic study of suitable material, as well as an intensive search for obscure foci of infection, would reveal some cases of bacterial and others of toxic origin. However, the finding of bacteria does not necessarily preclude the presence of a virus since secondary bacterial invasion occurs in the course of certain known virus diseases. Aside from the variety of clinical conditions which fall into the preceding group, a relatively large number of cases is encountered with neurologic findings similar to those of certain established virus diseases. In very few of these cases, however, is a final clinical diagnosis of a specific virus infection of the nervous system not debatable. The basis for disputing such a diagnosis is the same as in bacterial diseases where any number of individuals may present practically the same manifestations effected by different organisms. Because the inadequacy of our methods renders it difficult to isolate and identify a virus from a living patient is not sufficient excuse to make the invasion of the nervous system by a specific virus a final diagnosis which has been based on presumptive clinical evidence.

Like the neurologist, the neuropathologist frequently finds it impracticable to attribute a disease to a specific virus even though adequate postmortem studies have been carried out on

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eases clinically proffered as being of virus etiology. In cases where the clinical evidence favors infection with a nonbacterial agent the pathologic reactions found in the nervous system might be considered to fall into four principal groups.

The first group is composed of cases which are notable in that the findings are essentially negative typified particularly in conditions classified as Landry's paralysis without definite evidence of myelitis.<sup>10-16</sup> The etiology of this group remains obscure except for the apparent bacterial sterility of the nervous tissue in a considerable number of the cases studied.

The second group is comprised of cases which present a response similar to that occurring in association with or following certain known virus diseases or vaccination as manifest the postinfective and the postvaccinal encephalitis.<sup>17-22, 50-52, 74-75, 80</sup> The most striking histopathologic feature common to the group is perivascular demyelination. There is no sure evidence concerning the precise etiology of such conditions. Some investigators have suggested the effect as being produced by the virus of the initiatory infection or by the activation of a pre-existing neurotropic virus, others that the causation lies in an allergic response. It is of interest to note that Rivers and his co-workers have produced demyelination in monkeys by the repeated intramuscular injection of aqueous emulsions and alcohol-ether extracts of fresh sterile normal rabbit brain. The condition so produced was not transmissible to other monkeys.

The third group is composed of cases in which the lesions are not characteristic of a particular virus but rather may be induced by a number of different viruses. Such a picture is presented by cases where the reaction is characterized by a variable degree of degeneration, necrosis and proliferation of the neural elements together with a secondary infiltration of mononuclear cells predominant in the Virchow-Robin's spaces. This type of pathologic response is exemplified in the similarity of the lesions noted in the nervous system in both the Japanese<sup>53</sup> and the St. Louis<sup>42</sup> epidemics of encephalitis despite the dissimilarity of the specific causative viruses.<sup>47, 52, 53, 54, 55</sup> Furthermore the pathologic findings in the foregoing neurotropic virus diseases are usually impossible to differentiate from those of von Economo's disease where the etiology is unknown.<sup>15, 16, 24, 27, 41, 43, 44, 55, 56</sup> Mention should be made of cases where in similar reactions there is revealed as an additional feature the presence of intranuclear inclusions of a type occurring in diseases produced by certain different viruses. Dawson's case of lethargic encephalitis<sup>12</sup> illustrates the foregoing response. In his photographs the in-

clusions resemble those of experimental meningitis or encephalitis induced with the viruses herpes simplex (in rabbits and *Cebus monkeys*)<sup>15, 44, 45</sup> 'B' (in rabbits and *Macacus rhesus* monkeys)<sup>41, 42, 55</sup> that of salivary gland disease of guinea pigs<sup>24</sup> of mice<sup>25, 26, 73</sup> or of rats<sup>5, 26</sup> and many others. In cases of this type it is obvious from the preceding remarks that a specific diagnosis from the pathologic findings alone is impossible although the changes would be considered indicative of the presence of a virus by the majority of neuropathologists.

The fourth group consists of cases which can be conclusively diagnosed by the pathologic findings. In such instances the response so far as is known is effected only by a specific virus. Rabies caused by "street virus" exemplifies this type of distinctive histopathologic reaction.<sup>53, 54, 55</sup>

In considering the specificity of certain pathologic responses problems connected with intracellular inclusions are of interest.<sup>7, 9, 57</sup> Aside from virus diseases of the nervous system where a distinctive histopathologic type of inclusion body serves as an index for accurately diagnosing the specific etiology as is exemplified in rabies<sup>53, 54, 55, 56</sup> and in Borna disease<sup>47, 49</sup> some inclusion-bearing cells as has been previously noted may be encountered which are not particularly characteristic for any one virus. In addition to this difficulty some intracellular inclusions may be confused with and sometimes be impossible to differentiate from certain normal and abnormal intracellular elements of analogous structure. Of such a classification are intracellular alterations due to the injection of hypertonic glucose and certain other solutions<sup>23, 29, 55</sup> postmortem decomposition and imperfect fixation<sup>11</sup> degenerative changes especially of the oxochromatic type,<sup>40</sup> plasmosomes,<sup>8</sup> normal granules, the masses described by Scharer and Gaupp<sup>58</sup> in the nuclei supraopticus and paraventricularis and accumulations of lipoid<sup>22</sup> and other substances.

Attention is now directed to biologic problems related to the isolation and the identification of viruses capable of attacking cells of the nervous system. The primary difficulty in some of these affections is obtaining specimens suitable for experimentation from the living individual. Illustrative of this point are diseases with no significant systemic phase where the etiologic agent is transferred directly from the portal of entry to the brain and the cord by the local nerves. The strict neurotropic viruses, those of poliomyelitis,<sup>6, 27</sup> rabies<sup>25, 27</sup> and Borna disease<sup>47, 49</sup> exemplify this mode of penetration. Such viruses attack the nerve cells directly multiply therein and bring about necrosis. In conditions of this type the portal of entry is the most likely site from which to secure material for experimental study. The time at which the

Surgery of these conditions is of a comparatively recent date. The first case reported was approached extravesically and was done about 1896. In 1902 or 1903 Young reported the first case approached from an intravesical incision. Up to 1915 the number of successfully operated cases was very small. At the present day, the choice of surgical procedure is the operation which Young has so well outlined, and the usual method is to invert the sac and excise it completely.

I report here two cases of multiple bladder diverticula. One was a man, thirty-six years old, with a definite stricture as the underlying cause. There were three large diverticula, one on each side where the ureters enter the bladder and the third in the region of the urachus. In this case the ureters were not involved and the surgical procedure was carried out with very little difficulty. The results as you see from the cystogram one year later, were all that could be desired. In the second case, the man was fifty-six years of age and there was no definite bladder neck obstruction that could be demonstrated. Two large diverticula, the one on the left having the ureter enter at the base of the sac, were successfully

removed. The left ureter was reimplanted at the site of the excision. The final result, as you can see by the cystogram, is fairly good, although there still exists some hydronephrosis. What the end-result will be of course will depend on whether we have any stricture of the ureter at the site of reimplantation.

In approaching these cases surgically, I have found that suction with glass tubes about the size of the opening of the diverticulum is a great aid in everting the sac. Where a sac is particularly adherent and it is impossible to completely evert it, usually a line of cleavage of the mucous membrane can be established and complete removal of the membrane with freshening of the edges and double suture of the bladder wall and mucous membrane suffices to give an excellent surgical result. Packing the sac of a diverticulum with gauze and approaching extravesically may, in certain cases, aid in bringing about a successful inversion. But, where the sac is situated posteriorly, this is often impossible and, in these cases, the fibrous wall that is usually adherent to the underlying structures is not disturbed and simple removal of the mucous lining and suture of the opening is all that is necessary.

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erible criticism on the same score. To emphasize the importance of spontaneous virus diseases in animals further one might point to the demonstration of antiviral substances for the viruses herpes simplex and "B" in many *Macacus rhesus* monkeys<sup>17-23</sup> the complications caused by spontaneous lymphocytic choriomeningitis in monkeys in the experiments of Armstrong and Lillie on the St. Louis virus of epidemic encephalitis<sup>24</sup> and the similarity of the lesions found in Theiler's disease of mice<sup>25</sup> canine distemper<sup>26</sup> fox encephalitis<sup>27</sup> and others to those of certain virus diseases involving the central nervous system of man.

Following experimental isolation of a virus inaccurate identification is not uncommon. This is usually due to a lack of knowledge concerning a naturally acquired immunity in the majority of animals of a certain species to the virus under investigation. Inability to produce artificial infection in these animals leads to an inaccurate conception of the host range which is an important factor in classifying a virus. The scope of this particular biologic problem is evident when one recalls the apparent insusceptibility of New World monkeys to poliomyelitis virus<sup>28</sup> and the difficulties encountered in producing "takes" in a considerable number of *Macacus rhesus* monkeys with the viruses herpes simplex<sup>17-25</sup> and "B."<sup>23-26</sup> In addition to the possibility of failing to establish the host range another complication is related to the possible existence of a variable degree of cross-immunity between a number of different known viruses<sup>29-31</sup> and the particular virus under study. Owing to such an immunologic relationship identification by serologic procedures may be misleading.

When it has been decided that a virus derives from specimens secured from patients or at autopsy, one may have difficulty in proving conclusively that the original human affection was produced by this particular agent. Except in individuals who develop during the course of the disease immune substances for the "experimentally isolated virus", substantiation of its specificity is largely adduced from indirect evidence. In this connection, confirmation is usually based on demonstrating the "recovered virus" to be serologically identical with a virus that has been proved the cause of a similar human disease. However, should a virus be isolated exclusively from material obtained post mortem from a case peculiar in having neither the clinical nor the pathologic findings analogous to those of an established virus disease and in giving no information regarding the possible humoral response prior to death, to advance as indisputable proof that the "recovered virus" induced the human affection would be without additional evidence, presumptuous. In such an

instance the experimental reproduction in animals of a clinical and a pathologic picture comparable to that found in the human being is the most convincing circumstantial data. Despite inconclusive proof suggestive findings of the preceding type should be reported for by so doing other workers will be stimulated to investigate similar cases. Eventually on the experimental data accumulated from a number of different sources a final conclusion can be reached concerning the specific etiology of the particular human affection involved.

Many problems are related to the production of immunity to virus diseases of the nervous system.<sup>1-26</sup> As is well known considerable time is required to effect active immunization. In a disease such as rabies where the incubation period is very long vaccination can be successfully carried out. However, such a procedure is useless except for prophylactic purposes in diseases with a short incubation period. With the latter idea in mind, a considerable number of investigators have suggested the use of inactivated virus for immunization on a large scale. In this connection a great deal of controversy exists as to the effectiveness and the dangers involved in the use of neurovaccines containing supposedly inactivated virus. Recently this has been exemplified in the lively disputes regarding the Brodie<sup>32</sup> and the Kolmer<sup>33-34</sup> poliomyelitis vaccines. The important equivocal points brought out respecting so-called inactivated neurovaccines indicate

- (1) It is almost impossible to determine by available methods when a virus is completely inactivated. The limitations of biologic assay are evident when one considers the number of human fatalities occurring in nonepidemic areas following the exhibition of the Brodie and Kolmer neurovaccines.<sup>35</sup>

- (2) If a preparation is completely inactivated, the production of immunity through its use is doubtful in most instances.

- (3) The amount of neurovaccine required to effect immunity in animals is not always applicable to man.

- (4) If immunity should be produced in man by an inactivated neurovaccine, the resistance would be probably of short duration. This is important where vaccines are expensive to make and difficult to administer.

- (5) Finally, the exhibition of a vaccine containing nervous tissue is invariably accompanied by the potential danger of postvaccinal encephalitis.<sup>32-34</sup>

From the preceding remarks, it is obvious that a great many problems need to be solved before the use of inactivated neurovaccines becomes a practical and a safe procedure in the prevention of virus diseases of the nervous system.

specimen is taken would seem to have an important bearing on the outcome of biologic cultivation. This is borne out by the infrequency with which the virus of poliomyelitis has been demonstrated in specimens from the respiratory tract of contacts and of individuals with the disease.<sup>40</sup> Certain other virus diseases with neurologic involvement differ from the foregoing strictly neurotropic group in that the viruses attack, multiply and produce demonstrable changes in tissues outside the nervous system. In such affections, virus may or may not be detected in the blood at certain times during the course of the experimental disease, as in infections with the virus of equine encephalitis,<sup>28, 78</sup> "B" virus,<sup>41</sup> the virus of louping-ill,<sup>14, 19, 59</sup> and others. It is not to be inferred that the presence of a virus in the circulation invariably indicates, in cases which later develop neurologic disorders, that the nervous system was necessarily involved directly through the blood stream, although this may occur by "growth through" the blood-brain barrier<sup>27</sup> or by the rupture of a diseased blood vessel.<sup>72</sup> The more usual belief, supported by a considerable amount of experimental evidence,<sup>26, 27</sup> is that the virus invades the nervous system by the peripheral nerves. Aside from the preceding groups, including neurotropes and pantropes, lymphocytic choriomeningitis is unique in that the causative virus has been isolated from spinal fluid.<sup>57</sup> From the preceding remarks, it will be apparent that, when one is attempting to isolate a virus from a patient, repeated biologic assay of specimens from all probable sources is essential. The possibility that the condition under investigation was induced by a virus, can seldom, if ever, be ruled out entirely on negative experimental results.

The handling of specimens prior to inoculation is important. Inactivation of virus may be due to a lengthy interval between death of the patient and autopsy, prolonged storage in glycerin or fixation in some kinds of glycerin. Aside from the difficulty of maintaining asepsis in the routine preparation of inocula, potency may be lost through insufficient or excessive dilution or through permitting the inocula to stand for some time, especially at room temperature. The latter should be avoided particularly where one is using emulsions of nervous tissue, since the injection of partially autolysed extracts of normal homologous brain has been found to induce paralysis in a considerable percentage of normal rabbits.<sup>23, 71, 74</sup> Filtration<sup>54</sup> of inocula may result in the loss of viruses which are filtrable only under special conditions. Loss of filter-passing viruses will take place if the porosity of the filter employed is smaller than the size of the virus particles or if the electrical charge on both filter and virus is the same. Furthermore, this process may separate out some

particular bacteria essential to the activity of the filter-passer.

It is common knowledge that the isolation of a virus is dependent upon the susceptibility of the host to artificial infection. Hence, when one is attempting to demonstrate the presence of virus in specimens from a human case, the finding of a susceptible host is a real problem. The reason lies in the fact that some viruses are species specific, even to the point of being effective only in a single strain of a particular species, while others have a limited host range. In certain instances, another factor determining the susceptibility of the host to artificial infection is the relation between the age of the animal and the site of inoculation employed. In working with the virus of vesicular stomatitis, Sabin and his co-workers<sup>64</sup> have shown that while the young of certain species are susceptible to infection by all routes, nasal instillation and cutaneous inoculation in the majority of mature animals of the same species are ineffective. In contrast, the same mature animals, resistant by these routes, could be affected by intracerebral injection or by injection of the nerve fibre supplying the cutaneous area that had been previously injected. With the preceding facts in mind, negative experimental results even when one has available virus containing material, may be attributable to not having injected a suitable host or to having used an undesirable route for inoculation in mature animals of a susceptible species.

Aside from securing in an infinite series of susceptible hosts a consistent reaction similar to that effected by the primary inoculation, some experimental animals show considerable variation in the serial response. In certain instances where no primary reaction is apparent in the host, rapid serial passage in a particular species may enhance the virulence of the infective agent to the degree of inducing manifestations of disease. The isolation of "B" virus in rabbits<sup>66</sup> attests to the effectiveness of such a procedure. Occasionally, the converse type of response occurs, as evidenced in a primary reaction in the host which either suddenly or gradually disappears over a small number of serial transfers. In most instances, such reactions are difficult to explain even on a purely theoretical basis.

One of the greatest problems in biologic experimentation lies in the presence of an unrecognized spontaneous virus disease in the host. Some of these affections exist in apparently normal animals and become manifest following slight operative interference, such as intracerebral injection or serial passage of infective material to a nonimmune host.<sup>70</sup> As is well known the results of certain investigations dealing with virus diseases of the nervous system have been either erroneously interpreted due to incidental contamination by such viruses or open to consid-

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In connection with the subject of vaccination one associates the unusual and the untoward sequelae manifest in postvaccinal encephalitis.<sup>22 74 75 80</sup> Since the etiology of this condition is obscure, there can be no specific therapy. Practical experience attests to the fact that vaccination carried out during the first year of life is rarely, if ever, followed by encephalitis. Thus, it behooves one to advocate more strongly vaccination in infancy.

Perhaps, some brief mention should be made of immunizing methods involving the use of neutral mixtures.<sup>56</sup> Such procedures are based on experiments showing that the exhibition of a mixture containing an appropriate amount of serum from a recovered host together with the homologous virus, usually does not produce in a susceptible animal the disease but rather an apparent immunity. Contrastingly, considerable experimental evidence indicates that certain viruses are not killed or inactivated in neutral mixtures, their activity is merely retarded. This has been particularly well demonstrated in Green's *in vivo* experiments on fox encephalitis<sup>20</sup> in which a large percentage of foxes given neutral mixtures developed the disease after a very prolonged incubation period. From the foregoing experimental evidence, it is apparent that neutral mixtures are potentially dangerous and are impracticable to employ in man.

Problems pertaining to the therapeutic use of antiviral serums in neurotropic virus diseases are of interest.<sup>29 27 56</sup> In this connection certain important factors should be considered. In some strictly neurotropic virus diseases, as previously noted, the nervous system is involved from the first, the infective agent being either attached to or within many of the nerve cells. Thus, antibodies introduced into the systemic system must penetrate the hematoencephalic barrier and the cell membrane to be effective. Under normal conditions the blood-brain barrier is capable of holding back circulating antibodies. Whether the cell membrane is permeable to such complex molecules is not clear. It would seem, therefore, that once a nerve cell is affected by a virus, treatment with antiserum can be of little value. One would think that uninvolved cells might be protected to some extent by antiviral serum. However, if the response in other virus diseases of the nervous system is comparable to that in acute poliomyelitis, protection seems most unlikely. Another noteworthy point relative to therapy with antiviral serums is brought out in studies on equine encephalitis. In the artificial infection in monkeys, it has been shown that, following the appearance of humoral neutralizing antibodies, approximately half of the animals develop encephalitis and die. Such being true in this and in certain other virus diseases involving the

nervous system, the uselessness of administering antiviral serum is evident.

Recently, interesting experimental studies dealing with the prevention of certain neurotropic virus diseases have been reported. The work is based on the hypothesis that the transmission of virus to the nervous system, by the olfactory route at least, would be impossible if a block were placed between the nerve endings and the virus. In experiments on acute poliomyelitis in monkeys, an apparently effective barrier was produced by repeated intranasal irrigation of certain chemicals<sup>50</sup> or by the repeated application of alum or tannic acid to the nasal mucosa,<sup>52 53</sup> since in the majority of animals so treated attempts to induce infection by the nasal route were unsuccessful. However, the experiments cited are in a very preliminary stage. Much more substantiation of this work is necessary before human prophylaxis should be considered.

Some of the practical difficulties that may be encountered in the study of virus diseases of the nervous system have been pointed out and it is hoped that they will emphasize the need of more careful evaluation of clinical and of laboratory data.

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alone, and none in which there was deformity of the pulmonic valve great enough to produce stenosis or insufficiency. We are, therefore, limited to a comparison of accuracy in single with that in combined aortic and mitral disease.

TABLE 2  
PERCENTAGE OF CASES IN WHICH AN ACCURATE  
DIAGNOSIS WAS MADE

	By the General Service	By Ex- perts	By Experts Moribund Cases Excluded
AS uncomplicated	40	47.8	52.9
AS complicated	60	61.8	67.9
AI uncomplicated	100	100	100
AI complicated	82.4	84.6	84.6
MS uncomplicated	75	87.5	92.9
MS complicated	78.9	80.4	87.2
MI uncomplicated	50	37.5	42.9
MI complicated	36.4	50	42.9

In making the clinical correlations, we have reviewed the diagnoses made by the hospital staff as a whole and have considered separately those cases seen by some member of the staff we consider particularly adept in cardiovascular diagnosis. From this last group we have made still another correlation after eliminating cases which were moribund on admission (cases in which reasonable accuracy in diagnosis could hardly be expected).

Table 1 shows the number of cases in each group together with the number correctly diagnosed and table 2 shows the accuracy of diagnosis in percentages. It is evident that accuracy in the diagnosis of aortic stenosis was better when this lesion existed in the presence of deformity of other valves than when the aortic valve alone was involved. In the case of insufficiency of the aortic valve the reverse is true. Mitral stenosis was diagnosed with approximately the same accuracy with and without deformity of other valves. Insufficiency of the mitral valve without stenosis was also diagnosed with

essentially the same accuracy whether or not other valves were deformed.

*Comment.* It is particularly significant that mitral stenosis was correctly diagnosed with approximately the same accuracy whether other valves were deformed or not. The same accuracy obtained even in the presence of aortic insufficiency, a fact which tends to diminish the importance of the Austin Flint murmur as a factor leading to error in the diagnosis of mitral stenosis. It is probable that unless the aortic insufficiency is of marked degree the long rumbling low-pitched diastolic murmur at the apex is as indicative of mitral stenosis as it is when aortic insufficiency is absent.

The better recognition of aortic stenosis in the combined form is possibly due to the fact that many of the combined cases were associated with mitral stenosis, a lesion overlooked with comparative rarity, and that when disease is found in one valve, the examiner is likely to search exhaustively for involvement of other valves. We are often inclined to dismiss, as unimportant, systolic murmurs heard at the base of the heart, but when mitral stenosis is known to be present, we are perhaps likely to search more carefully for the confirmatory aortic systolic thrill.

*Summary and Conclusions.* This correlation of clinical diagnoses with postmortem findings has shown first, that the diagnosis of aortic stenosis is more accurate when the lesion exists in combination with deformity of other valves than when the other valves are normal; secondly, that the diagnosis of aortic insufficiency is less accurate when other valves are also involved; thirdly, that the condition of the other valves makes no material difference in the accuracy with which lesions of the mitral valve are recognized. This series lends no support, then, to the common belief that diagnostic accuracy is poorer in combined valvular disease than it is in uncomplicated deformity of but a single valve, except in the case of aortic insufficiency.

#### DO YOU KNOW?

The first law to regulate the practice of medicine in the colonies was passed in Massachusetts in 1649; a similar act was made law in New York State 1665.

Alexander the Great, Persius and Terence died just under or over thirty years of age. Keats, Shelley and Schubert had their careers cut short. How little this really proves is shown by the fact that the average age at death of the eminent men of antiquity was 66.7 years while in modern times 82 noted mathematicians averaged 64.3, 75 poets 64.1 and all the presidents of the United States 68.4. The figures so often cited about increasing the expectation of life and supposed to prove this or that refer to expectation at time of birth. This increase

is the result of removing many of the perils of infancy and early childhood. In the modern era more babies grow up to maturity than before but among people who arrive at maturity the average do not live to die at a greater age than formerly.

#### CONTRIBUTIONS TO AID IN RESEARCH RELATING TO CLINICAL MEDICINE

The Committee on Scientific Research of the American Medical Association invites applications for grants of money to aid in research on problems bearing more or less directly on clinical medicine. Preference is given to requests for moderate amounts to meet specific needs. For application forms and further information please address the committee at 535 North Dearborn Street, Chicago—*Science* 84:244 (Sept. 11) 1936.



A COMPARISON OF ACCURACY IN THE DIAGNOSIS OF  
SINGLE AND MULTIPLE VALVULAR DISEASE  
OF THE HEART\*

BY WILLIAM PAUL THOMPSON, M D,† AND SAMUEL A. LEVINE, M D ‡

MANY physicians, competent in the diagnosis of valvular disease of the heart, commit themselves as to the specific lesions with some reluctance when two or more of the valves are thought to be involved. The belief that our diagnostic ability is limited in multiple valvular disease has become rather firmly rooted in the minds of many practitioners and teachers, to the extent that in some quarters there is great hesitancy in diagnosing with certainty even the common combination of mitral stenosis

findings (except that the great number of un complicated cases of mitral stenosis made it unnecessary to review more than a part of them). Cases were freely excluded when the actual existence of stenosis or insufficiency was debatable anatomically, so that the series cannot be taken to represent the comparative incidence of the various combinations. Only a few examples of aortic insufficiency are included, largely because we often found great difficulty in convincing ourselves, from the descriptions, that

TABLE 1  
NUMBER OF CASES IN EACH COMBINATION AND NUMBER CORRECTLY DIAGNOSED

	Cases Seen by the General Service				Num ber Seen	Cases Seen by Experts				Num ber Seen	Cases Seen by Experts Moribund Cases Excluded						
	Num- ber Seen	Number Correctly Diagnosed				Num ber Seen	Number Correctly Diagnosed				Num ber Seen	Number Correctly Diagnosed					
		AS	AI	MS			MI	AS	AI			MS	MI	AS	AI	MS	MI
AS	45	18	—	—	—	23	11	—	—	—	17	9	—	—	—		
AI	10	—	10	—	—	7	—	7	—	—	6	—	6	—	—		
MS	24	—	—	18	—	16	—	—	14	—	14	—	—	13	—		
MI	16	—	—	—	8	8	—	—	—	3	7	—	—	—	3		
AS & MS	33	17	—	24	—	18	11	—	14	—	15	10	—	12	—		
AS & MI	3	1	—	—	1	3	2	—	—	1	2	2	—	—	0		
AI & MS	8	—	6	7	—	5	—	4	4	—	5	—	4	4	—		
AI & MI	5	—	5	—	3	4	—	4	—	3	4	—	4	—	3		
MS & TS	6	—	—	5	—	3	—	—	2	—	3	—	—	2	—		
MS & TI	3	—	—	1	—	3	—	—	1	—	1	—	—	1	—		
MI & TI	2	—	—	—	0	1	—	—	—	0	1	—	—	—	0		
AS MS & TS	13	6	—	12	—	10	6	—	9	—	8	5	—	8	—		
AS, MS & TI	4	2	—	3	—	3	2	—	3	—	3	2	—	3	—		
AS, MI & TI	1	0	—	—	0	0	—	—	—	—	0	—	—	—	—		
AI MS & TS	2	—	1	2	—	2	—	1	2	—	2	—	1	2	—		
AI MS & TI	2	—	2	2	—	2	—	2	2	—	2	—	2	2	—		

A means aortic 'M' mitral 'T', tricuspid 'S', stenosis and I, insufficiency. Thus "AS" means aortic stenosis TI tricuspid insufficiency and so forth

with aortic insufficiency. We are not aware of any evidence in support of this belief, and a review of the literature has revealed no correlation of antemortem diagnoses with postmortem findings directly concerned with this question. This note is concerned with an effort to establish the truth or falsity of the belief.

All cases of chronic rheumatic valvular disease examined postmortem at the Peter Bent Brigham Hospital were reviewed, and the clinical diagnoses were correlated with the anatomic

findings. There had actually been regurgitation of blood. We have not regarded the "water test" for aortic regurgitation as a reliable guide to the presence or absence of this lesion.

In grouping the cases we have regarded stenosis as the major lesion for a given valve, and have disregarded the additional presence of insufficiency of that valve. Insufficiency in the absence of stenosis, however, has not been disregarded. We have compared, for example, cases of aortic stenosis (with or without insufficiency) in which the other valves were normal with cases in which this lesion was combined with stenosis or insufficiency of one or more of the other valves. The same process was repeated for the mitral valve. There were no cases in which the tricuspid valve was involved

\*From the Medical Clinic of the Peter Bent Brigham Hospital.  
Aided by a grant from the Proctor Fund of Harvard University for the Study of Chronic Diseases.  
†Thompson William Paul—Research Fellow in Medicine Harvard University Medical School. Levine Samuel A.—Assistant Professor of Medicine Harvard University Medical School.  
For records and addresses of authors see "This Week's Issue" page 683.

Thursday Afternoon

Meeting of the House of Delegates at 1 o'clock in the Fleming Museum Auditorium

List of members reports of the committees and order of business are printed in pamphlet form Copies may be obtained at the registration desk

Two o'clock

11 President's Address — L W Burbank M D Cabot

12 Address—J H J Upham M D, Columbus Ohio President Elect of American Medical Association

Title Heart Disease in Middle and Past Middle Life

13 Paper—Guy L Hunner, M D Baltimore Maryland, Professor of Gynecology Johns Hopkins University School of Medicine

Title The Urinary Tract in Relation to Diagnosis of Abdominal and Pelvic Lesions

14 Address—R R Savers, M D Washington D C Medical Officer in Charge of Industrial Hygiene United States Public Health Service

Title Silicosis and Similar Dust Diseases

Thursday Evening at Seven o'clock at the Ethan Allen Club

The Annual Banquet

Anniversary Chairman, O N Eastman, M D Burlington

Friday Forenoon Nine o'clock at the Fleming Museum

15 Report of the House of Delegates

16 Symposium — Arranged by Reginald H Smithwick M D Boston Mass

Medical Aspects of Vascular Disease Robert S Palmer, M D Boston Assistant in Medicine at Massachusetts General Hospital Instructor in Medicine at Harvard Medical School

General Management and Treatment of Peripheral Vascular Lesions in Diabetics and Non-Diabetics Theodore C Pratt M D Boston, Assistant in Surgery at Massachusetts General Hospital Assistant in Surgery in Courses for Graduates at Harvard Medical School

Special Methods of Treatment of Peripheral Vascular Lesions (Discussion of Passive Vascular Exercises Peripheral Nerve Block Embolectomy etc) Robert R Linton M D Boston Assistant Surgeon at Massachusetts General Hospital Instructor in Surgery at Harvard Medical School

Present Methods of Treating Varicose Veins Henry H Faxon M D Boston Assistant Surgeon at Massachusetts General Hospital Assistant in Surgery at Harvard Medical School

The Value of Sympathectomy in the Treatment of Vascular Disease (Raynaud's Disease Angina Pectoris Essential Hyperten-

sion) Reginald H Smithwick, M D, Boston Assistant Surgeon at Massachusetts General Hospital Assistant in Surgery at Harvard Medical School

ENTERTAINMENT

The doctors will have golf privileges at the Country Club on payment of a small Greens Fee

LADIES ENTERTAINMENT

The Athena Club will be open Thursday morning for the Visiting Ladies

Luncheon will be served at the Athena Club, 328 Pearl Street at 1 p m Thursday October 15 Visiting ladies and wives of Burlington doctors are invited to be guests of the State Medical Society

Following lunch there will be bridge at the Athena Club for any who wish to play

NOTES

The Headquarters of the Society and Registration Desk will be in the Foyer of the Fleming Museum on Colchester Avenue Banquet tickets should be purchased when registering

BY LAWS

Article IX—Time for Papers

No author shall consume more than twenty minutes in reading or presenting a paper and no one shall speak more than five minutes in the discussion of a paper without unanimous consent of the members present

Article X—Addresses Property of Society

All addresses and papers presented in the County and State Societies thereby become the property of the State Society, and shall be placed in the hands of the Secretary within one week after the meeting, for insertion in the Records

Article XI—Order of Business

The program as prepared by the Executive Committee and published in accordance with the By Laws by the Secretary shall constitute the order of business and cannot be changed or suspended except for a definite purpose a limited time and by a two-thirds vote of the members present

SCIENTIFIC EXHIBITORS

Dr W B Fitch St. Johnsbury

Dr D E Sheffield St Johnsbury

Dr W R Harkness Montpelier

Dr R E Avery Barre

Dr Wilmer Angell Randolph

Dr Leslie Sycamore Hanover N H

Dr B F Cook, Rutland

Dr E J Rogers Pittsford

Dr L E Sample St. Albans

Dr R H Seeley Rutland

Dr C S Leach Brattleboro

Dr N R Caldwell Burlington

Dr A B Soule Jr Burlington

## VERMONT STATE MEDICAL SOCIETY

The One Hundred and TwentyThird Annual Meeting of the Vermont State Medical Society will be held at the Fleming Museum Auditorium, Burlington, Vermont, Thursday and Friday October 15 and 16 1936

### OFFICERS FOR 1935 1936

President Lester W Burbank, Cabot  
Vice President John Trotter, Jr, Bennington  
Secretary William G Ricker, St Johnsbury  
Treasurer David Marvin, Essex Junction  
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Executive Committee B F Cook, Rutland W G  
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E J Quinn, Castleton, E A Tobin, Bennington  
Medical Education S W Hammond (1), Rutland  
S S Eddy (2), Middlebury, N R Caldwell (3),  
Burlington  
Necrology Committee B D Adams, Burlington,  
G G Marshall, Rutland H L Pierce, Swanton  
Medico Legal Committee F E Farmer (1),  
St Johnsbury, E A. Hyatt (2), St Albans,  
J N Jenne (3), Burlington  
Health and Public Instruction F J Lawliss, Rich  
ford A B Soule, Burlington Stewart Ross,  
Rutland A B Woodman, Springfield, E H But  
ties, Burlington

### DELEGATES

Maine L R Goodrich Vergennes  
New Hampshire G B Hyde, Wilmington  
Massachusetts G R Anderson, Brattleboro  
Connecticut L H Ross, Bennington  
Rhode Island A. L Fogg, Burlington  
New York L E Sample, St Albans  
American Medical Association W G Ricker  
St Johnsbury  
Alternate C H Beecher, Burlington  
Anniversary Chairman O N Eastman, Burlington  
Members of New England Medical Council J H  
Woodruff, Barre, G G Marshall Rutland W G  
Ricker, St Johnsbury, J A. Stevenson, Ches  
ter, E A. Hyatt, St. Albans  
Nominating Committee George B Hyde, Wilming  
ton F J Lawliss Richford Frank C Phelps,  
Vergennes

### LOCAL COMMITTEE OF ARRANGEMENTS

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Clark  
Ladies Committee Mrs W T Rees Chairman  
Reception Committee Mrs P K. French, Chair  
man

Luncheon Committee Mrs Sam Sparhawk Jr,  
Chairman  
Bridge Committee Mrs K C McMahon, Chairman.  
Transportation Mrs A G Mackay

### OFFICERS OF THE HOUSE OF DELEGATES

President F J Lawliss, Richford  
1st Vice-President Ralph Seeley, Rutland.  
2nd Vice President E D McSweeney, Burlington  
Secretary E J Rogers, Pittsford

Wednesday evening October 14, 8 p m Prelimi  
nary Meeting of House of Delegates on the Roof Gar  
den of the Hotel Vermont

Thursday afternoon, October 15, 1 p m Regular  
session of House of Delegates at Fleming Museum

All delegates must present credentials signed by  
the President and Secretary of their respective Coun  
ty Societies

### PROGRAM

Thursday Forenoon, October 15, 1936, at nine-thirty  
o'clock at the Fleming Museum

- 1 Call to Order by the President—L W Burbank,  
MD, Cabot.
- 2 Invocation—Rev William Fisher Lewis
- 3 Address of Welcome—President Guy W Bailey,  
University of Vermont
- 4 Reports of the Officers and Committees
- 5 Reception of Delegates from other Societies
- 6 Vice-President's Address — John Trotter, MD,  
Bennington  
Title "The Trend of Medical Practice as I  
See It Today"
- 7 Address — Doris A. Murray MD, Washington,  
D C Children's Bureau, Department of La  
bor  
Title 'Maternal and Child Health and  
Crippled Children's Programs Under the So  
cial Security Act'
- 8 Paper—Franklin P Lowry MD, Newton Mass  
achusetts, Consultant in Education of Phys  
ical Therapy of the American Medical Asso  
ciation, Instructor in Physical Therapy at  
Sargent College of Physical Education, Med  
ical School of Boston University and Tufts  
College Medical School  
Title "The Value of Physical Therapy in  
the Practice of Medicine"
- 9 Announcements by Exhibitors of Scientific  
Specimens
- 10 Paper — A D Rood MD, Springfield Mass  
achusetts Associate Professor of Bronchos  
copy, University of Vermont, College of Med  
icine, Consulting Bronchoscopist to Mary  
Fletcher Hospital Burlington Westfield Tu  
berculosis Sanatorium Cooley Dickinson  
Hospital Northampton Massachusetts  
Title Postoperative Pulmonary Atelec  
tasis

**CASE RECORDS**  
*of the*  
**MASSACHUSETTS GENERAL  
HOSPITAL**

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 22411

PRESENTATION OF CASE

A sixty-eight year old native businessman was admitted complaining of vomiting.

The patient was quite drowsy when first seen and the history was obtained with considerable difficulty for he did not respond very coherently. About one year before entry he first noted that he was losing weight. This progressed up to his entrance to the hospital. About a month before admission his friends commented upon the fact that his skin was yellow, a condition which persisted for about one week and then disappeared. Ten days before entry the skin again became yellow for two to three days. A physician who saw him originally said that he had no jaundice. During these attacks he said that his urine had been darker than normal but he had noticed no change in the color of his stools. For about a month he had become increasingly more constipated and stated that he had no bowel movement for a week prior to entry. He had considerable pruritus currently and had been hiccoughing for about seven to ten days. Ten days before coming to the hospital he began to vomit "brownish material" following the ingestion of any food. He had anorexia and took fluids only in very small quantities. No complaint of pain was elicited from the patient although his housekeeper claimed that he had an attack of constant severe right upper quadrant pain five weeks and again eight days before admission. The initial attack lasted about five days and was only partially relieved by morphine. For about five days he exhibited generalized twitching.

Physical examination showed an elderly sick looking, drowsy man, hiccoughing and exhibiting frequent twitching of the left arm. There was evidence of considerable weight loss and there were numerous scratch marks on the skin. The skin was pallid and there was no evidence of icterus. The pupils were small, slightly irregular, and reacted sluggishly to light. The tongue was dry and had a heavy grayish-brown

coating. The throat was reddened and dry. The heart extended 12 centimeters to the left of the midsternal line. An occasional premature beat was audible and there was a soft blowing systolic murmur at the apex. The blood pressure was 160/60. Bronchovesicular breath sounds were audible at both bases, where also numerous fine moist râles were heard. The abdomen was obese and distended and the flanks were full. Tympany was elicited over an area 10 centimeters in diameter in the region of the umbilicus. A questionable shifting dullness in the right flank was demonstrated, and in the region of the cecum a large, cyst-like tympanitic mass was felt. Peristaltic sounds were present but diminished in intensity. Liver dullness of both left and right lobes extended three finger-breadths beneath the costal margin. The patient did not complain of pain and no localized spasm was demonstrated. A rectal examination showed an enlarged smooth prostate but was otherwise negative.

The temperature was 97°, the pulse 90. The respirations were 20.

Examination of the urine showed a specific gravity of 1.010 with a slight trace of albumin. The sediment contained 36 white blood cells but the examination was otherwise negative. The blood showed a red cell count of 4,600,000, with a hemoglobin of 80 per cent. The white cell count was 17,800, 95 per cent polymorphonuclears. A stool specimen gave a three plus reaction to the guaiac test and fluid from a gastric lavage gave a one plus reaction. The non-protein nitrogen of the blood was 190 milligrams. A carbon dioxide combining power was 42.2 volumes per cent. The chlorides were equivalent to 87 cubic centimeters N/10 sodium chloride per 100 cubic centimeters. A blood sugar of 208 milligrams was obtained six hours after 1,200 cc of 10 per cent glucose had been administered intravenously.

An x-ray of the abdomen showed a markedly dilated cecum and considerable gas in the small bowel. The transverse colon contained a moderate quantity of gas. A barium enema was expelled almost as rapidly as it entered the bowel, but it was possible to outline the greater part of the colon. There was a large rounded defect in the rectum which resembled a fecolith. The sigmoid was small, rather spastic, and appeared to contain several small diverticula. The ascending colon showed a constant constriction at about the crest of the ilium and in this region were what appeared to be filling defects. The cecum was unusually long and markedly dilated. A chest film showed an enlarged heart and wide mediastinum. The diaphragm was high. There was an oval area of density just above the right diaphragm and the right lung root was larger than the left. There was limited excursion of the right leaf of the diaphragm.

## COMMERCIAL EXHIBITORS

Elmer N Blackwell  
Cameron Surgical Specialty Company  
Otis Clapp & Son  
Davies, Rose & Co, Ltd  
The Denver Chemical Mfg Company  
Endo Products Incorporated  
George C Frye Company  
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P J Noyes Company  
Phillip Morris & Company, Ltd  
R J Strassenburgh Company  
Surgeons and Physicians Supply Company

## MISCELLANY

## VERMONT DEPARTMENT OF PUBLIC HEALTH

AUGUST, 1936

The following communicable diseases were reported to the office of the Department of Public Health during the month of August whooping cough 96 mumps 20 chickenpox 20 undulant fever 4, scarlet fever 11, measles 5, German measles 7 and diphtheria 1

The Laboratory of Hygiene made 2 007 examinations, the details of which are as follows

Examinations for diphtheria bacilli	89
“ Widal reaction for typhoid fever	57
“ undulant fever	83
“ gonococci in pus	176
“ tubercle bacilli	173
“ syphilis	602
of water chemical and bacteriological	221
water, bacteriological	341
milk market	142

Examinations of milk, submitted for chemical only	0
“ “ milk, submitted for microscopical only	9
“ “ foods	2
“ “ drugs	6
“ for courts, autopsies	7
“ “ courts, miscellaneous	30
Autopsies to complete death returns	4
Other Examinations	71
Total Examinations	2 007

The Director of the Division of Venereal Diseases reports 56 cases of gonorrhea and 65 cases of syphilis made to the Division in August Six hundred and twenty five Wassermann outfits and 334 slides for gonorrhea were distributed from this Division

The Crippled Children's Division reports 100 patients seen at their homes 503 at clinics and 4 at the Burlington office making a total of 607 patients One patient was admitted and one discharged from the Massachusetts General Hospital and one patient was discharged from the Rutland Hospital Twelve pieces of apparatus were altered or repaired and forty four orthopedic corrections were made to shoes The Vocational Worker of this Division reports sales made amounting to \$222 87

The Director of the Maternal and Child Health Division reports that he assisted in the examination of children at the summer roundup held at Waits River, and also that he attended the meeting of the Franklin County Medical Society A dentist has been engaged for this Division and is to start work September 1

The Public Health Nursing Division reports seven nurses now in the field, with health centers established at Wallingford, Randolph Center and Boltonville The WPA Nursing Projects are being continued and more nurses added as schools open Six hundred and thirty-one notifications of birth registration, 260 diphtheria consent cards and 560 baby booklets were mailed out during the month of August.

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novocain and see if drainage of the cecum and drainage of the abscess were possible

DR TRACY B MALLORY Dr Young has received one of these left-handed compliments of being given a nearly impossible case. I think it is fair to say that the surgical service did not have a much more definite idea as to what was wrong with the patient than Dr Young did.

#### CLINICAL DISCUSSION

DR OLIVER COPE I am much encouraged to find that Dr Young has come to nearly the same conclusions that I did. Before operation I was very much perplexed about the diagnosis. When this patient entered the hospital he was moribund. He improved considerably with intravenous water, salt and glucose. With this improvement, tenderness became apparent in the right flank. After three days a definite mass was palpable. I believe that when he first arrived he was too sick to feel the pain. The patient himself was unable to give a history and the reports we got from friends were conflicting and confusing. I operated on him under a mistaken diagnosis. I thought he probably had a malignancy of the hepatic colon which had perforated, giving him an abscess in the flank. In spite of air visible by x-ray in the transverse colon I operated with the idea of relieving the pressure in his cecum which was obviously dilated both by x-ray and abdominal palpation. I was afraid the obstruction was complete and the cecum might blow out. Fortunately I made a right rectus incision and an adequate exploration was easily obtained. It was quite obvious that the mass in the right flank was inflammatory tissue rising from the head of the pancreas burrowing laterally. This pancreatic mass accounted for the filling defect seen by barium enema and the dilated cecum was partially obstructed. There were extensive areas of fat necrosis everywhere and the entire pancreas was involved. On going back over the history it became obvious that the attack of pain which he had had five weeks before entry was gallbladder disease. There was no vomiting with this attack. He had gone to Maine on a vacation and there had had a recurrence of the pain, but this time with severe vomiting which continued. The vomiting without adequate treatment, with loss of upper intestinal contents and no fluid intake accounted for the high nonprotein nitrogen and chloride loss. With the rapid dehydration and uremia the pain of the pancreatitis disappeared into the background. I suspect that this second attack which occurred ten days before entry was gallbladder disease complicated by acute pancreatitis. The autopsy findings corroborated what we found at operation.

#### CLINICAL DIAGNOSES

Preoperative	Carcinoma of the cecum with perforation
	Intestinal obstruction
Postoperative	Chronic cholecystitis
	Cholelithiasis
	Acute pancreatitis
	Uremia
	Bronchopneumonia
	Hypertensive heart disease

#### DR EDWARD L YOUNG'S DIAGNOSES

Intestinal obstruction?, malignancy?  
Chronic cholecystitis and cholangitis  
Uremia

#### ANATOMIC DIAGNOSES

Pancreatitis, acute  
Peritonitis, acute generalized  
Fat necrosis of the peritoneum  
Chronic cholecystitis  
Cholelithiasis  
Operative wound Cholecystectomy with drainage and drainage of acute pancreatitis  
Intestinal obstruction, partial  
Hydrothorax, bilateral  
Pulmonary edema  
Diverticulum of the colon  
Arteriosclerosis, moderate, aortic (Hypertensive heart disease)  
Peripheral edema, marked

#### PATHOLOGIC DISCUSSION

DR. MALLORY The entire pancreas was completely necrotic and consisted of a large, swollen, hemorrhagic mass filled with areas of fat necrosis. The process had begun, as it not infrequently does in cases of pancreatitis of some days' or weeks' standing, to spread in all directions along the posterior abdominal wall so that large abscesses consisting of liquefied necrotic material were found in both gutters, running nearly the entire length of the posterior abdominal wall. The gallbladder was found at operation to contain stones, most of which were removed, though we found one still present. There were no stones in the common duct. The kidneys were a little above normal size and they showed a severe grade of chronic vascular nephritis, enough perhaps to explain his uremia, but they also showed rather marked acute degeneration of the convoluted tubules, a finding which is not uncommon in cases of pancreatitis, so that I think there was an added acute nephrosis which increased the degree of uremia beyond what it otherwise might have been.

The transverse colon appeared to be rather definitely obstructed by a mass of adhesions connecting it to the pancreas.

DR. HAMPTON We have had three or four

and both bases showed diminished radiance

The patient was treated supportively for three days, during which time the chlorides rose to 103 and the nonprotein nitrogen was lowered to 150 milligrams. The patient seemed much improved and for the first time complained of tenderness in the right flank, which appeared to bulge somewhat. With apparent improvement his white cell count rose to 30,000, and on the third hospital day a laparotomy was performed.

#### NOTES ON THE HISTORY

DR EDWARD L. YOUNG, JR. Vomiting, I think, is something like our school friend Gaul, very roughly it is divided into three parts: toxic, obstructive and irritative, generally a mixture.

The picture extends back over a year, with loss of weight, intermittent attacks of jaundice, two attacks of right upper quadrant pain severe enough to need morphia and not to be entirely relieved by it. The story of past symptoms points toward a toxic condition, biliary in origin.

"The abdomen was distended and the flanks were full." Here is evidence of some process in the abdomen which must have produced a considerable degree of fluid. There is nothing so far to suggest a localized septic process, that is no spasm or tenderness and no pain that the patient complained of. The temperature backs that up. It was subnormal, 97°. The pulse was 90, and the respirations 20.

Assuming that we are considering malignancy this is a surprisingly good blood picture for a man who has been losing weight from that cause over a period of a year.

"The white cell count was 17,000, 95 per cent polymorphonuclears." That is the first suggestion of some septic process.

"A carbon dioxide combining power was 42.2 volumes per cent." He is getting toward the level of acidosis.

A one plus guaiac from gastric lavage is not of serious importance. A three plus guaiac in the stool probably means something important going on in the bowel.

"An x-ray of the abdomen showed a markedly dilated cecum and considerable gas in the small bowel." I assume that is a flat plate and spells obstruction of some type.

"A barium enema was expelled almost as rapidly as it entered the bowel, but it was possible to outline the greater part of the colon." I shall ask Dr. Hampton to speak of this, but if that is true we cannot be dealing with an acute obstruction low in the large intestine. I am going to ask Dr. Hampton if he will not help me out. So far, I find some features suggestive of malignancy and others suggestive of an acute septic process, possibly gallbladder.

#### X-RAY INTERPRETATION

DR. AUBREY O. HAMPTON. I remember this patient very well. I did the examination. I was asked if I was perfectly certain this was an intrinsic tumor of the bowel. I said, "Yes, I would be, if I could rule out fecolith." There was one in the rectum and it may be logical to suppose he had one higher up but that would not account for the constriction. The constriction in one of these plates is consistent with an intrinsic lesion, but in this other view it is not quite what you would expect.

Here is the chest taken back down, so of course everything we see is magnified, but there is a shadow above the right side of the diaphragm with diminished radiance, more on the right. The right leaf of the diaphragm did not move so well as the left. The remark about the lung root I think you can discount because we see very little of the lung root due to the magnified aorta.

#### DIFFERENTIAL DIAGNOSIS

DR. YOUNG. It seems to me we will have to make two or three diagnoses here to account for the whole picture. We cannot have a diagnosis that will fit everything perfectly. First, is this an intestinal obstruction due to the lesion described here? Certainly we can throw out any obstruction from a lesion in the sigmoid. It is perfectly possible that this man has a lesion in the cecum which has gone on and has now perforated, with abscess formation, which will account for the increased white count, the tenderness, and the mass in the right flank. If there is obstruction, that will account for the high nonprotein nitrogen and his vomiting. Then the final white count and tenderness and mass could go with a perforation of carcinoma of the cecum.

What about his jaundice and the evidence of trouble in the gallbladder, and the elevated and fixed diaphragm? It is perfectly possible of course that he has a process which might be malignant in the biliary tract and that that has gone on to perforation. I question a subdiaphragmatic abscess, but at the same time I cannot rule it out. I do not see how I can fit all this picture into disease of the biliary tract or under one diagnosis. It would be very unusual for a metastatic process from the biliary tract to jump down to the right iliac fossa and cause any such picture as that, and it is equally difficult to imagine a primary cecal lesion spreading in such a way as to cause these attacks of transient pain and jaundice. I prefer to assume there may be two separate diseases, old chronic gallbladder with stones and cholangitis, or a slowly growing malignancy in the cecum with obstruction, and with a terminal perforation. I believe there was nothing to do but put in some

well originate from low down as the history of tenesmus and inflammation suggests that it may well have done.

The type of pain described suggests obstructive attacks. They sound like definite attacks of acute colic of some type. The duration was such that one must consider them as rather more than passing intestinal upsets.

"Vaginal examination showed marked uterine procidentia. That would perhaps explain the few episodes of dark bloody vaginal discharge. One would expect under these circumstances that she might very well bleed from the cervix or have a vaginitis and the blood could accumulate in the vagina while the prolapse was reduced.

"A rough mass was palpated on the posterior wall of the uterus." If the uterus was well outside that observation is probably very reliable because the mass must have been easy to feel and by the same token it would seem that it probably was not in the rectum because it would be easy in a procidentia to palpate both the rectum and the uterus.

The laboratory work is essentially negative. The red cells in the catheter specimen are not to be taken seriously. We have to presume that the stools were examined while warm with the idea of excluding amebae although this is not mentioned.

#### DIFFERENTIAL DIAGNOSIS

The history would seem to me to suggest that there had been a definite inflammatory process of the colon dating back six months. The history of two episodes of a week and ten days of diarrhea in the past may quite well have been a factor in the situation. On the other hand one cannot be sure of that. She had lost eleven pounds in weight and yet she looked very well. We have several perfectly definite facts: the presence of a polypoid defect in the sigmoid and a history of diverticula. In the presence of a diverticulosis with intermittent attacks of inflammation one expects episodes of looseness of the stools but the history of six months of constant looseness with as great frequency as she had, I do not think can be explained on the basis of diverticulitis. A benign polyp in that location ought not to produce obstruction of such degree that the roentgenologist could not force barium past it.

The fact that the proctoscopy did show a definite inflammatory process in the lower bowel together with the history of the case establishes the fact that she did have a colitis. It may have been rather mild at first and she may have had some bleeding without seeing it. I suppose, but the presence of true polyps in association with ulcerative colitis is quite common and the presence of coexisting cancer also occurs with

some degree of frequency. I should think that this was in all probability a case of definite inflammatory disease of the colon. It may possibly have been amebic, or it may have been an idiopathic ulcerative colitis. We know she had a polyp and it is quite possible in fact quite probable that she had malignant degeneration producing the obstruction in the sigmoid. On the other hand the whole picture may have been due to diverticulitis.

#### CLINICAL DISCUSSION

DR. LELAND S. MCKITTRICK: I think it is a little unfortunate that on proctoscopic examination they used the statement "slightly boggy mucous membrane with a finely granular surface which bled easily" because the only way you can interpret that is as Dr. Hayden has. It is typical of a mild degree of ulcerative colitis. I happened to see this patient and, while I did not proctoscope her myself, I am sure the second proctoscopy did not show any abnormality of the mucous membrane below. I think it is fair to say that the sole finding by proctoscopy was the mass at the tip end of the instrument. Dr. Hayden has been given quite the wrong impression by the first statement in the record.

DR. TRACY B. MALLORY: I think it would be only fair to let him modify his opinion.

DR. HAYDEN: We still have to explain the six months of diarrhea and this seems a little difficult to do. If she did not have definite ulceration of the mucous membrane, typical of ulcerative colitis in the rectum then she probably did not have ulcerative colitis. She did have a polyp. We know that she had obstruction and we know she had diverticula. She passed blood but it was bright. Her loss of weight suggests cancer, but her lack of anemia does not. The diagnosis must lie between malignant degeneration of a polyp and obstructive diverticulitis and I incline toward the first diagnosis.

DR. MALLORY: Will you tell us what you found Dr. McKittrick?

DR. MCKITTRICK: I thought she had a carcinoma of the sigmoid. I thought she had a polyp of long standing which had become malignant. I explained the past history on the basis of a benign polyp which had been present over a period of years and which ultimately became malignant. She was operated upon under that preoperative diagnosis.

At operation she had an intussusception and one could not see anything more than that at the time. It was impossible to reduce it with gentle manipulation and whether she had a cancer or not I did not know at the time of resection. An end-to-end anastomosis using the Kerr technique and a cecostomy were done. The liver was negative. There was no evidence of pelvic metastases. The pelvis was not ex-



cases of marked dilatation of the cecum due to inflammatory mass in the right upper quadrant, particularly the gallbladder. The patients come in with definite obstructive symptoms and the x-ray findings, particularly on a plain film, are very misleading.

## CASE 22412

### PRESENTATION OF CASE

A sixty-four year old Danish housewife was admitted complaining of diarrhea.

Six months before entry the patient suddenly developed diarrhea, consisting of four to six loose watery movements daily. The stools were normal in color and contained neither mucus nor blood. There was no associated pain, although she frequently had a sensation of incomplete evacuation. Except for a two day interval, during which her stools were normal in appearance and frequency, the diarrhea persisted up to admission and was unaffected by medication. The frequency was, however, slightly decreased by rest. One month prior to admission the frequency increased to ten to twenty times daily, but there was only a rare movement at night. At this time she first noted once or twice daily the passage of one or two tablespoonfuls of bright red blood. There were no tarry stools. She began to suffer occasional transient, dull, griping pain over the entire lower abdomen unrelated to meals, defecation, or activity. The pain rarely persisted for longer than a minute. She lost about eleven pounds in six months, but except for her intestinal symptoms felt quite well. There was never any nausea, emesis, fever or chills. She had lived on a farm in Massachusetts since coming to this country and had never been in the South. Her menopause occurred fourteen years previously but she had noticed the passage of foul smelling dark brown blood without clots three or four times since then. This discharge usually lasted a day or two and was never sufficiently copious to require the use of a napkin. It had last occurred one year before entry.

Twenty years previously the patient had a sudden attack of fever, rigor, profound weakness, tenesmus, and diarrhea which persisted for ten days. She had a similar attack eleven years later which lasted for about a week. There was no associated melena, nausea, or emesis.

Physical examination showed a well-developed and nourished elderly woman in no distress. There was complete edentia. The left border of cardiac dullness extended ten centimeters from the midsternal line. There was a blowing apical systolic murmur. The blood pressure was 175/120. The lungs were clear. Vaginal examination showed marked uterine procidentia. A rough mass was palpated on the posterior

wall of the uterus. There was a questionable mass in the left lower quadrant. No details relative to these masses were recorded.

The temperature was 99°, the pulse 80. The respirations were 20.

Examination of an uncatheterized specimen of urine showed a specific gravity of 1.028, a slight trace of albumin, an occasional white blood cell, and 15 to 20 red blood cells. The blood showed a red cell count of 4,500,000, with a hemoglobin of 85 per cent. The white cell count was 8,300, 70 per cent polymorphonuclear. Four stool specimens were negative. Two gave positive reactions to the guaiac test, one of which contained grossly visible blood. Agglutination reactions for dysentery bacilli were negative. The serum protein was 6.2 grams per cent. A Hinton test was negative. Gastric analysis showed 0 free hydrochloric acid and 10 combined acid in a fasting specimen. After histamine the readings were 5 and 10 respectively. The blood uric acid was 5.59 milligrams per cent. An intravenous phenolsulphonephthalein test showed 35 per cent excretion of dye in two hours.

A barium enema showed the passage of barium to the midsigmoid, where a large polypoid defect was outlined. No barium passed beyond this point despite considerable ballooning of the rectum. The films showed a large irregular filling defect and several small diverticula in this region.

On the day after admission a proctoscopy showed a slightly boggy mucous membrane with a finely granular surface which bled easily. No frank ulceration was seen. There was much mucus and some pus and blood. Another proctoscopy four days later was said to have demonstrated a walnut-sized polypoid mass in the sigmoid. On the thirteenth day operation was performed.

### NOTES ON THE HISTORY

DR. E. PARKER HAYDEN: "She frequently had a sensation of incomplete evacuation." That I suppose is synonymous with so called tenesmus, which suggests the probability of an irritative process somewhere down near the anus.

"One month prior to admission the frequency increased to ten or twenty times daily, but there was only a rare movement at night." That point makes me wonder whether the whole thing may be on a functional rather than an organic basis, but on the other hand some decrease at night is rather to be expected because of inactivity.

"At this time she first noted once or twice daily the passage of one or two tablespoonfuls of bright red blood." In the presence of an infective or irritative process this could perfectly

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## CANCER INCIDENCE HAS PASSED A PEAK

RECENTLY another gloomy report on cancer was released to the press by the famous statistician, Dr Frederick L. Hoffman,<sup>1</sup> who showed that the *crude* cancer death rate in the United States is still increasing. Since then Dr Henry D. Chadwick<sup>2</sup> of the Massachusetts Department of Public Health has stated that cancer is decreasing in Massachusetts. Now Dr Louis I. Dublin<sup>3</sup> of the Metropolitan Life Insurance Company finds that a study of cancer among the policyholders of that company shows that deaths from cancer are *not* increasing when certain statistical factors are properly evaluated.

How is it possible that such eminent statisticians can make such totally opposing statements? It is because, as is usual in any field of knowledge where eminent men disagree, they are not talking about the same thing although they seem to be doing so.

What is the true situation in regard to cancer mortality? Whose opinion is correct? What the individual without cancer is interested in

is how likely he is to develop cancer at some subsequent date and, if it appears what his outlook for cure will be. No statistician or physician can tell anything about either of these likelihoods with any degree of accuracy as there are at present *no figures dealing directly with either problem*. All statistics on the numerical relation between cancer and population are based on deaths reported in death certificates to be due to cancer. From these figures, which by their nature are not entirely accurate to start with, statisticians have to make a sort of backhanded, indirect approach to the problem of cancer incidence.

What is the most obvious and serious source of the misleading conclusion drawn from Dr Hoffman's statistics by those unaware of the exact meaning of his figures? There is no question that these are correct in showing that the actual number of deaths reported due to cancer are increasing, both numerically and on a basis of percentage of cancer deaths to living individuals. But this does not mean that any one individual's chance of developing cancer is increased except in so far as the possibility is greater because he will, on the average, live longer. Due to the reduction of immigration and the falling birth and death rates, the population of the United States has been aging rapidly. That this aging of the population has a very marked tendency to increase the apparent incidence of cancer deaths is clear when one considers that the number of cancer deaths per unit population at the age of 60 is roughly three times that at 50 and eight times that at 40. These enormous increases in a few years are enough to show that an average aging of the population of only one half year would have a very significant effect on the crude cancer death rate.

Dr Chadwick's statistics, which show a significant decrease in the Massachusetts cancer death rate, have allowed for this source of apparent error by referring each year's cancer deaths in each age group to a population of the same percentage of age distribution. This is one of the newer statistical methods which has been accepted as sound by statisticians and mathematicians and is used as a standard procedure in many parts of the world.

*The enormous labor of the workers in the field of cancer is succeeding as shown by the test of results. Any individual's chance of dying from cancer is not greater but a little less than it was a few years ago when considered on the basis of his present life expectancy.*

## REFERENCES

- 1 Hoffman, Frederick L. The cancer record of 1935. The Spectator 13:16 1936.
- 2 Chadwick, Henry D. and Lombard Herbert L. The Massachusetts Cancer Program. New Eng J Med 215:265 1936.
- 3 See page 657 of this issue of the Journal.

posed, only in so far as we could see a little of it in the walling off and so forth

#### PREOPERATIVE DIAGNOSES

Carcinoma of the sigmoid with obstruction  
Polyp of the sigmoid

#### DR E PARKER HAYDEN'S DIAGNOSES

Carcinoma developing in a benign adenoma  
Diverticulosis

#### PATHOLOGIC DIAGNOSES

Adenosarcoma of the sigmoid  
? Endometrioma of the sigmoid with sarcomatous degeneration  
Intussusception of the sigmoid  
Necrosis of the mucosa of the sigmoid

#### PATHOLOGIC DISCUSSION

DR MALLORY The intussusception in this case was irreducible. When we opened the intestine we found a very unusual appearance. A polypoid tumor appeared to be projecting into the lumen. The mucosa over the tip of this was necrotic and ulcerated but there was nothing to suggest any carcinomatous change, and over the rest of the tumor it appeared fairly normal and was pouring out large amounts of mucus. Grossly the lesion was soft, not indurated.

When we made microscopic sections we found a tumor that was unlike anything I have ever seen. The mucosa except for the one necrotic area was perfectly normal. In the submucosa we found a tumor in which were various small glandular spaces lined with low columnar epithelium and a very abundant amount of actively growing fibrous stroma producing no collagen at all. It could be described as an adenosarcoma, although that seems to me only a descriptive term which really means nothing. The appearance was quite suggestive of an endometrial invasion of the wall of the sigmoid. Of course the patient's age makes that seem extremely improbable. The nearest to a reasonable guess I can make on the case is that she did have a long time in the past an adenomyoma which invaded the wall of the sigmoid as we have seen them do several times. The tumor was fairly small and caused no symptoms but within the last few months a sarcomatous degeneration of the stroma had taken place and I think that we are now dealing with a fibrosarcoma. Otherwise, I have no explanation whatever for the presence of small glands deep in the wall of the bowel, in the middle of the tumor mass, when we can completely rule out cancer. Invasive epithelial growth has certainly not taken place from the mucous membrane downward and the best guess is that it must have come in from outside.

much appreciated As explained by a representative of the Public Health Service we can see no objection to sending in all of these completed blanks

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

DENNY-BROWN, DEREK ERNEST M B, Ch B, University of Otago New Zealand 1924 D Phil Oxford 1928 M R C P, London 1931 Beit Memorial Fellow Oxford 1925 1928 Registrar and Resident Medical Officer National Hospital Queen Square 1928-1935 Assistant Physician 1935- and Chief Assistant, Neurological Clinic St Bartholomew's Hospital London 1935 His subject is Nervous Disturbances of the Vesical Sphincter Page 647 Address 74 Wimpole Street W 1, London, England

HEPBURN, THOMAS N A B A M M D Johns Hopkins University School of Medicine 1905 F A C S Urological Surgeon, Hartford Hospital Consulting Urological Surgeon, New Britain General Hospital, New Britain, Rockville General Hospital Rockville, Charlotte Hungerford Hospital, Torrington, Manchester General Hospital Manchester, Meriden General Hospital, Meriden, and Bristol Hospital Bristol His subject is A Case of "Auto-Prostatectomy" Due to Tuberculosis Page 653 Address 179 Allen Street, Hartford, Conn

NEUSWANGER, C H A B, M S, M D Harvard University Medical School 1923 F A C S Assistant Clinical Professor of Surgery, Yale University School of Medicine Assistant Attending Surgeon New Haven Hospital Attending Urologist St Mary's Hospital and Waterbury Hospital, Waterbury, Conn His subject is Uretero-Ureteral Anastomosis with Report of a Case Page 653 Address 89 North Main Street Waterbury, Conn

PRATHER GEORGE C M D Harvard University Medical School 1924 F A C S Formerly, Assistant Urologist, Massachusetts General Hospital Now, Assistant Urologist Beth Israel Hospital and Boston Lying-in Hospital Urologist, Newton Hospital Consultant Urologist, Herwood Memorial Hospital, Norwood Mass Community Hospital, Ayer, Mass and Marl-

boro Hospital Marlboro, Mass Assistant in Anatomy, Harvard University Medical School Address 99 Commonwealth Avenue, Boston, Mass Associated with him is

FRIEDMAN HARRY F M D Vanderbilt University School of Medicine 1912 Attending Radiologist and Director of Tumor Clinic Beth Israel Hospital Consultant Radiation Therapist Massachusetts Memorial Hospitals and New England Hospital for Women and Children Address 270 Commonwealth Avenue, Boston, Mass Their subject is The Immediate Effect of Preoperative Radiation in Cortical Tumors of the Kidney Page 655

PETERS CLINTON N A B, M D Bowdoin Medical School 1914 F A C S Urologist, Maine General Hospital Consulting Urologist U S Marine Hospital United States Public Health Service, Portland, Me His subject is Bladder Diverticula with Reimplantation of the Ureter Page 663 Address 156 Free Street Portland, Me

THOMPSON JUANITA B Sc, M D University of Toronto Faculty of Medicine 1928 Fellow in Bacteriology, Department of Bacteriology University of Toronto 1928-1929 Pathologist, The Memorial Hospital, Worcester Mass 1929-1931 Research Associate, Department of Medical Research, Banting Institute, University of Toronto 1931-1934 Rockefeller Foundation Fellow in Neurology, Department of Neurology, New York University College of Medicine 1934-1936 Her subject is Virus Problems in Diseases of the Nervous System Page 664 Address 104 Mt Auburn Street, Watertown, Mass

THOMPSON, WILLIAM PAUL B S, M D Harvard University Medical School 1931 Research Fellow in Medicine, Harvard University Medical School Address 516 Park Drive, Boston, Mass Associated with him is

LEVINE, SAMUEL A A B, M D Harvard University Medical School 1914 Assistant Professor of Medicine Harvard University Medical School Senior Associate Physician Peter Bent Brigham Hospital Address 270 Commonwealth Avenue, Boston, Mass Their subject is A Comparison of Accuracy in the Diagnosis of Single and Multiple Valvular Disease of the Heart Page 670

## HARVARD MEDICAL SCHOOL IN REVIEW

THE shouting and the tumult have died away, the captains and the kings have departed and Harvard's Tercentenary Celebration lives in the memory of the exalted loyalty shown by the University's many alumni, in the rededication of our venerable institution to intellectual freedom in the search for truth, and in the more tangible, though no more valuable gifts that have been poured into her lap

The Medical School, which has so recently celebrated its own sesquicentennial observance, played its own distinct rôle in these ceremonies and, although only half the age of its academic mother, is nevertheless old in rich traditions though sturdy in present performance. The history of the School has been prepared for tercentenary purposes, appropriately enough, by its former dean and present Hersey Professor of the Theory and Practice of Physic, Dr Henry A. Christian

Founded in 1782, the Medical School of Harvard University is the second oldest in the United States, being antedated in continuous activity only by the Medical School of the University of Pennsylvania. From its inception, its faculty has played a leading rôle in the health history of the country. Its first professor of the theory and practice of physic, Benjamin Waterhouse, introduced vaccination against smallpox into America. The second professor, James Jackson, with the second professor of surgery and anatomy, John C. Warren, in 1808 prepared for the Massachusetts Medical Society the first pharmacopoeia published in the United States. These two men were largely responsible for the founding of the Massachusetts General Hospital in 1821, where, in 1846, ether anesthesia was first publicly demonstrated on a patient of the professor of surgery, John Collins Warren.

In 1831, under the leadership of Dr. Warren, Massachusetts was the first state to provide legal means by which medical students might have human bodies for dissection. Jacob Bigelow influenced medical practice with his essay on the self-limited character of disease, published in the *Boston Medical and Surgical Journal*, Henry J. Bigelow invented a method of crushing bladder stones and discovered how to reduce dislocations of the hip by manipulation, Henry I. Bowditch and Morrill Wyman first performed thoracentesis, Reginald Heber Fitz demonstrated the true nature of appendicitis and pancreatitis, Oliver Wendell Holmes fearlessly publicized the contagiousness of puerperal fever.

These are historic discoveries and advances which emanated from the Harvard Medical School. More recent progress has no less benefited from the patient studies and occasionally

brilliant discoveries of a host of enthusiastic workers, animated by the desire to teach, to serve, and to follow the lines where truth might lie.

## A HEALTH SURVEY

THE United States Public Health Service has been engaged in a year's study of health conditions throughout certain areas in the United States. The work has been financed by grants from the WPA and the Public Health Service. That for Massachusetts, covering a year's work, has recently been completed as far as interviewing a cross section of the people of the state and has been carried on in Boston, Pittsfield, Greenfield, Ipswich and Fall River.

Taken throughout the country seventy-nine municipalities have been included with a selection of those with a population of five thousand up to that of New York City.

Taking Boston as an example, over three thousand families have been interviewed and a similar proportion in the other municipalities.

In response to the questions asked of families, all reported illnesses during the year have been scheduled on blanks and the records thus obtained have been submitted to the attending physicians for verification of the diagnoses reported by the laity and any other pertinent facts.

The reports, after being signed by the physicians, are tabulated in the Surgeon General's office, only the nature of the illness being transferred to a card catalogue. The original report with the name of the family and the physician is destroyed, so that the disease is in the permanent record without any person's name. These filled-in family reports have been forwarded to more than a thousand physicians in Massachusetts, but the returns have not been complete. It is recognized by investigators quite generally that physicians do not return blanks submitted for the recording of factual data and for that reason much useful information is never acquired.

Already the returns have brought out material which is regarded as important by the Public Health Service, but complete returns will add a great deal to the value of this study.

We are assured that there is to be no political use of the ascertained facts and that the knowledge of conditions set forth in the completed blanks will not be used for propaganda of any kind but will be devoted to the promotion of public health service.

With this assurance and the fact that no record will be kept of the name of the physician signing a report, doctors may be willing to forward all of the reports submitted to them. Emphasis has been made on the necessity of returning a report of even one or two cases.

General co-operation by doctors will be very

ceived a bachelor's degree in 1875. In 1880 he graduated a Doctor of Medicine from the Harvard Medical School. He served the following two years as house-pupil at the Massachusetts General Hospital. After this he went again to Europe and continued his medical studies for a year chiefly at Vienna. On his return to Boston in 1884 he began the practice of medicine and made neurology his specialty. He was soon appointed to the staff of the Boston Dispensary and at this time did investigative work in neurological subjects, and in 1886 published a scholarly paper on the subject of chronic tea poisoning\*. He demonstrated from a study of nearly two hundred confirmed tea-drinkers that a fairly well defined symptom-complex might be induced by overindulgence in tea.

In 1886 he established his connection with the department of nervous diseases at the Boston City Hospital. For three years he was assistant and later was physician in this department. With his associates Dr. Morton Prince and Dr. Philip Coombs Knapp, he worked for the enlargement of the existing neurological service to a permanent department provided with beds for the care of nervous and mental cases. During the twenty years he was connected with the Boston City Hospital, this aim was steadily approached in large measure as the result of his efforts. He left the City Hospital in 1906 to devote himself entirely to his work at the Children's Hospital where he had been Neurologist since 1888. He was particularly interested in problems concerning feeble-mindedness and in epilepsy. He wrote articles based on his investigations of these diseases as well as on functional and organic neurological topics and several in collaboration with Dr. H. L. Burrell on surgery of the central nervous system.

Dr. Bullard's enthusiasm for the study of the nervous system and its ramified disorders made him active in the foundation of the Monson State Hospital for Epileptics at Palmer, Massachusetts. As chairman of the board of trustees he did much to encourage the development of this institution which from a small beginning has grown to be one of the most important of its kind in the country. He further encouraged the new science of neurology by establishing at the Harvard Medical School a chair of neuropathology now known as the Bullard Professorship.

During his medical career Dr. Bullard did much of his clinical work at the Carney Hospital in South Boston. He was also a member of the national society for the study of feeble-mindedness and of the national association for the care and study of epilepsy and during his lifetime was president of these organizations. He was a member of the American Medical Association and the Massachusetts Medical Society. He also kept in touch with the world outside medicine through his memberships in the Somerset Club, the Harvard Club and the Tavern Club in which he centered his social literary and artistic interests.

Boston M. & S. J. 114:314 (April 5) 1936

Dr. Bullard had been admitted to the American Neurological Association in 1888. He became its president in 1912. In that year the society held its meeting in Boston, but he was unable to preside because of a serious operation which almost cost him his life. From this time on his health was not good and he retired from active medical practice. He had married Miss Mary R. Reynolds, the sister of Dr. Edward Reynolds, in 1900, and with her help he gathered a large collection of rare incunabula and medical books of all centuries. It was his particular plan to compile all such books as might have been used for reference at medical schools and hospitals in the fifteenth century, including dictionaries and vocabularies. With typical generosity he lent to the Boston Medical Library in 1927 one hundred volumes of incunabula, and in the following year presented to the Library his sixteenth and seventeenth century books numbering about five hundred volumes. This collection contains valuable and important classical texts, herbals and books on witchcraft, magic, astrology, demonology and chiromancy. Through his will his entire collection of incunabula as well as all other medical books, classical and modern, became the property of the Library. He also left a bequest of \$50,000 to be used for the purchase of books and manuscripts published prior to 1700.

In addition to his hobby of book collecting, Dr. Bullard was greatly interested in botany which he studied during his summers in Maine and on his frequent trips to Europe.

During the last six years of his life he was afflicted with a serious heart ailment which greatly curtailed his activities. Despite illness and failing eyesight, however, he continued his interest in neurology and public affairs. At the age of 77 while on a visit to Boston from his home in Lenox, Massachusetts, he was stricken suddenly and died on April 13, 1931.

Dr. Bullard was a man of strong personal convictions. He was genial, sympathetic and helpful to those who sought his advice. By his personal counsel and by the establishment of educational facilities he encouraged young men toward the accomplishment of their ambitions. His gift to the Boston Medical Library, the chair at the Harvard Medical School in memory of his father, and the neurological laboratories at the Boston City Hospital which are named after him bear testimony to the fact that he devoted himself and his wealth to the advancement of medical science and humanitarian ideals in the form of treatment, teaching and research in the field of diseases of the nervous system.

MEBRILL MOORE, M.D.

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## A PLAQUE IN MEMORY OF THE LATE WILLIAM NORTON BULLARD

On Tuesday, September 15, 1936, a hand-carved wooden plaque designed by Miss Mary O Abbott, Concord, was dedicated to the memory of the late William Norton Bullard on the ninth floor of the Medical Building at the Boston City Hospital. Many distinguished guests, including former associates of Dr Bullard, members of the Department of Diseases of the Nervous System of the Harvard Medical School and members of the staff of the Boston City Hospital were present. Dr Stanley Cobb, Professor of Neuropathology, spoke of the development of neurology at the Boston City Hospital where Dr Bullard had been associated for over twenty years. Dr James W Manary, Superintendent of the Boston City Hospital, spoke of the growth of the hospital with particular reference to the care of patients suffering from neurological disease. Dr Donald Munro, Chief of

the Neurosurgical Service described his recollections of Doctor Bullard and his association with Dr Munro's father. Dr Merrill Moore gave a résumé of the life of Dr Bullard. This was followed by the presentation of the memorial tablet by Mrs William Norton Bullard. Mr Joseph P Manning accepted the tablet for the trustees of the hospital.

The ninth floor of the Medical Building is occupied by offices, laboratories, and teaching facilities for the Department of Neurology. The space was first occupied in 1930 when the building was completed. Dr Bullard's influence was very important in establishing a neurological service at the Boston City Hospital. His interest in the teaching of neurology was very deep, and his influence is still felt in the hospital and at the Harvard Medical School.

The inscription on the tablet reads

This floor is devoted  
to the  
WILLIAM NORTON BULLARD  
MEMORIAL LABORATORIES  
and the offices  
of the  
Neurological Unit  
a joint undertaking of the  
BOSTON CITY HOSPITAL  
and the  
HARVARD MEDICAL SCHOOL  
made possible by a grant  
from the  
GENERAL EDUCATION BOARD  
of the  
Rockefeller Foundation  
for the investigation and  
treatment of diseases of  
the nervous system

WILLIAM NORTON BULLARD M.D.  
1853—1931

William Norton Bullard was born in Newport Rhode Island on August 23 1853 the son of William Story Bullard and Louisa Norton Bullard (who was

a sister of Professor Charles Elliot Norton of Harvard College). He received his preliminary education in Boston schools, but when he was seventeen he was prevented by an attack of typhoid fever from entering college, and spent one year in European travel. On returning he entered Harvard College and re

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## MISCELLANY

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Before this distinguished body of scientists representing many countries and races some facts were presented which at first glance seemed to stamp the cancer situation here as a particularly gloomy one. An American speaker Dr Louis I Dublin Third Vice-President and Statistician of the Metropolitan Life Insurance Company and a leading authority on public health problems declared that at least half a million persons in this country are afflicted with some form of cancer and that among white residents out of initial groups of 100 at birth nine males and twelve females will eventually die from cancer if present conditions continue. But in his summary of the entire situation Dr Dublin made the optimistic statement that the cancer situation in the United States is far from alarming.

Dr Dublin limited himself in the main to a discussion of cancer mortality. He based his facts largely upon the mortality experience of the insurance company explaining that, for the past quarter of a century the most comprehensive statistics on cancer in this country have been available from the experience of the Metropolitan's industrial policyholders. He described cancer as a major public health problem and said that it ranks second in this country in the list of causes of death while twenty five years ago it was only in seventh place.

This change in position Dr Dublin explained however is due primarily to a decline in the death rates of the other diseases.

The death rate from cancer in the last 25 years, Dr Dublin said rose 144 per cent, from 75.8 per 100,000 in 1911, to 86.7 per 100,000 in 1935. It is important, however to point out that practically all the recorded increase in cancer occurred among males among females the mortality from cancer declined slightly during this period.

Despite its recorded mortality increases Dr Dublin paradoxically questioned whether cancer has shown an actual increase as a cause of death. "If one were guided only by the recorded figures for cancer as a whole," he said "one would be led to believe that the death rate from this disease has increased during the last twenty five years. More careful analysis however is necessary, and when such analysis is made, it leads to a very different conclusion."

More cancers are recognized now than formerly, due Dr Dublin explained, to improved diagnostic technic. Another factor is that owing to the aging of the population more and more persons are surviving to the ages where the incidence of cancer is greatest. When these factors are evaluated it becomes apparent that they account for much of the increase which the crude death rate shows.

"Indeed," Dr Dublin continued, "we may say that the cancer situation in the United States is far from alarming. A number of forms of cancer are already showing declining trends. This is particularly true of those sites which are accessible and therefore more readily diagnosed. Throughout the country public and private facilities for the treatment of cases are increasing rapidly. Under the stimulus of the American Medical Association and of the more specialized societies of cancer experts cancer education and research are being encouraged and a large body of physicians is being trained to diagnose and treat cases more effectively. There are today about 200 cancer centers throughout the country which measure up to the standards of equipment and trained personnel established by the American College of Surgeons. One hospital in New York alone is now carrying over 12,000 patients on its active file. Other institutions with similar services are springing up in various parts of the country. It is encouraging to find that in the three years 1932 to 1934 the American College of Surgeons registered almost 25,000 living patients without recurring symptoms five or more years after treatment. These efforts will undoubtedly stimulate the movement for better control of cancer throughout the United States. —Metropolitan Life Insurance Company Information Service."

### REPORT OF THE MEDICAL SCHOOL OBSERVANCE OF THE HARVARD TRICENTENARY

Participation by the Harvard University Medical School in the observance of the Tercentenary of the University began officially on July 6, 1936 when the University placed its various buildings and activities on view. The history of the Harvard Medical School was illustrated by an exhibit at Holden



A case of cerebral localization with double trephining (acquired spastic hemiplegia porencephalus) Boston M & S J 118:162 164 1888 Also J A M A 10:228 230 1888

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A peculiar form of nystagmus (Cheyne-Stokes nystagmus) with a case Boston M & S J 127:301 303 1892 (With Wentworth A H)

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## OBITUARIES

Boston Evening Transcript April 13 1931

Arch Neurol & Psychiat 28:179 183 (July) 1931

## The Massachusetts Medical Society

### FOURTH ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning October 12

#### Barnstable

Sunday, October 18, at 4 00 p m, at the Cape Cod Hospital, Hyannis Subject Arthritis Diagnosis and Treatment. Instructor J S Barr John I B Vail, Chairman

#### Berkshire

Thursday, October 15, at 4 30 p m at the House of Mercy Hospital, Pittsfield Subject Diabetes Complications of Diabetes and Their Treatment Coma Insulin Reactions Surgery (Gangrene, Carbuncle, etc) Marriage and Pregnancy, Tuberculosis and Heart Disease Instructor Alexander Marble Melvin H Walker, Jr Chairman

#### Essex South

Tuesday, October 13 at 4 00 p m at the Salem Hospital Salem Subject Anesthesia (a) Drugs in Anesthesia (b) General Care of Patient in Anesthesia Instructor S C Wiggin Walter G Phippen Chairman

#### Franklin

Wednesday October 14 at 8 00 p m, at the Franklin County Public Hospital Greenfield Subject Blood Diseases The Hemoglobin and Red Blood Cells in Relation to Disease Instructor C W Heath Halbert G Stetson, Chairman

#### Hampden

Thursday October 15 at 4 00 p m at the Academy of Medicine Professional Building, 20 Maple Street Springfield and at 8 00 p m in the Outpatient Department of the Skinner Clinic, Holyoke Hospital Holyoke Subject Diabetes General Plan of Treatment in Uncomplicated Cases Diet Insulin (Regular and Protamine) Exercise Instructor H F Root George L Schadt and George D Henderson Chairmen

#### Hampshire

Wednesday October 14 at 4 15 p m in the Nurses Home of the Cooley Dickinson Hospital Northampton Subject Heart Disease Treatment of Cardiovascular Emergencies Instructor C L Derick Robert B Brigham, Chairman

# Middlesex East

Tuesday October 13 at 4 00 p m, at the Melrose Hospital Melrose Subject Stomach and Duodenal Ulcer Diagnosis and Treatment Instructor T V Umy Joseph H Fav Chairman

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Before this distinguished body of scientists representing many countries and races some facts were presented which at first glance seemed to stamp the cancer situation here as a particularly gloomy one An American speaker, Dr Louis I Dublin Third Vice-President and Statistician of the Metropolitan Life Insurance Company, and a leading authority on public health problems declared that at least half a million persons in this country are afflicted with some form of cancer and that among white residents out of initial groups of 100 at birth nine males and twelve females will eventually die from cancer if present conditions continue But in his summary of the entire situation Dr Dublin made the optimistic statement that the cancer situation in the United States is far from alarming

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Chapel in Cambridge, the original home of the School. This historical exhibit illustrated the growth and accomplishments of the Medical School since its founding in 1782. There was also a historical exhibit of the Dental School since its founding in 1867. At the Medical School buildings in Boston a number of exhibits had been arranged illustrating the work of the various departments. These consisted chiefly of the exhibit of the Warren Anatomical Museum, the Warren Collection of Incunabula and old volumes, portraits of former members of the faculty, the museum and library of the Dental School, and an exhibit by the Anatomical Department of the dissections in the Dwight Room and of a collection of memorabilia and data associated with the history of the department, particularly with the part played by Drs. Oliver Wendell Holmes and Charles Sedgwick Minot in the teaching of the department and the introduction and development of the microscope, and of microscopic anatomy and embryology. All these exhibits were maintained during the entire summer.

The Tercentenary days specifically set apart for observance by the Harvard Medical School, the Harvard Dental School, and the Harvard School of Public Health were September 14 and 15, in conjunction with the annual meetings of the Harvard Medical and Dental Alumni Associations. During the forenoon of September 14, demonstrations were held at the Medical School by the departments of Bacteriology, Pathological Chemistry, Comparative Pathology, Physiology, Physical Chemistry, and Tropical Medicine and at many of the Boston hospitals special clinics were held by members of the University teaching staff.

For the remainder of the time a series of four symposia had been arranged, which were opened on the afternoon of September 14, with a general introduction by Dr. David L. Edsall, Dean Emeritus of the Medical School. The first symposium on Nutrition and the Deficiency Diseases, under the chairmanship of Dr. George R. Minot, consisted of a series of nine papers by Drs. Gamble, Jones, Heath, Castle, Wolbach, Blackfan, Howe, Strauss, and Joslin. It is expected that these papers, and those of the other symposia, will be published in whole or in part in subsequent issues of this *Journal*. Dr. Castle speaking on the relationship of defective nutrition to changes in the gastrointestinal tract, emphasized that an adequate diet is essential, lest injury be done to organs which condition the raw material of the food before it enters the nutrient media of the body. Dr. Howe discussed malnutrition from the dental standpoint and Dr. Joslin spoke on protamine insulin and its advantages. Dr. Strauss discussed nerve disorders arising from defective nutrition and pointed out that these disorders, as seen not only during pregnancy and pernicious anemia but in alcoholics, are in the latter associated not with the specific action of alcohol but with the dietary deficiency chiefly in vitamin B which is often associated with habitual alcoholism.

On September 15, three symposia were carried on simultaneously throughout the day. The first on the Central and Sympathetic Nervous Systems, under the chairmanship of Dr. Walter B. Cannon presented a series of eight papers by Drs. White, Rosenblueth, Ayer, Davis, Gibbs, Cobb, Weiss and Putnam. Dr. Davis described the interesting electrical phenomena recently observed in relation to activity of the cerebral cortex. The analogy of these types of waves to the currents generated by heart muscle and recorded by the electrocardiogram makes them of physiologic interest as well as, possibly, of clinical value.

The symposium on the Infectious Diseases was presided over by Dr. Hans Zinsser and included a dozen papers covering a wide range of conditions of infective diseases,—typhus, influenza, gonorrhea, yellow fever, pneumonia, filariasis, trichinosis, and streptococcal infections. Dr. Smillie's epidemiologic studies on the virus of influenza suggested that the possibility of employing a definitely successful preventive agent against epidemic influenza may be not far distant.

Finally, in the symposium on the endocrine glands, over which Dr. J. H. Means presided, there was a series of eight papers, beginning with one by Dr. Wislocki demonstrating some new aspects of value in regard to the blood supply of the hypophysis. In the same symposium Dr. Cutler reported his clinical, surgical experience in the relation of *diabetes insipidus* to the hypophysis and the thyroid. Drs. Aub, Hastings, Albright and Churchill presented a group of associated papers dealing with hypophyseal-parathyroid relationships, the calcium equilibrium of the body, the action of the parathyroid hormone on the skeleton and the surgery of the parathyroids.

Following the conclusion of these symposia, was held the annual meeting of the Harvard Medical Alumni Association, which was so largely attended that the dinner of the Association, which it had been planned to hold in Vanderbilt Hall, was at short notice transferred to the Harvard Club in Boston. Following this dinner, over which Dr. Edwin A. Locke presided with gracious distinction, there were a number of addresses. President Conant spoke of past, present, and future relations between the Medical School and Harvard College and University. Dr. Roger I. Lee spoke in behalf of the Corporation and Dr. Channing Frothingham for the Overseers. Dr. Frank H. Lahey, responding for the graduates, emphasized particularly his belief that although full time teachers are highly desirable in laboratory subjects in the Medical School there should always be a place for the part time clinical teacher, whose value to the University consists in and depends upon the very fact of his active and continuous clinical experience. Dr. Alan Gregg speaking at the conclusion of the dinner surveyed the larger fields of the relation of medicine to the community and to human progress. All who attended this series of demonstrations and meetings must

have been effectively impressed with the progress and standing of the Harvard Medical School, the loyalty of its graduates and the favorable position of respect and importance which it holds not only in the University but in the community as a whole

#### THE CELEBRATION OF THE USE OF ETHER

The Massachusetts General Hospital has arranged a program for October 16, to celebrate the nineteenth anniversary of the use of ether in that hospital

An informal luncheon will be served to invited guests at 1 o'clock to be followed by a scientific program conducted by the medical and surgical staffs

An address by Dr Paul D White will be delivered at 4 o'clock in the Moseley Memorial Building

#### A COURSE IN PHYSICAL THERAPY

The honor of being one of only twelve institutions in the entire country to have a course for physical therapy technicians conforming to the standard adopted by the American Medical Association in 1936 has been won by Boston University's Sargent College of Physical Education according to an announcement made recently by Dr Daniel L Marsh, President and Dean Ernst Hermann

During the last two years of the four-year curriculum, a student may major in the field of physical therapy at Sargent College, and upon graduation the student is eligible for membership in the American Physiotherapy Association. The course is given in co-operation with the Boston University School of Medicine and clinical work is done during the senior year in the Massachusetts General, Massachusetts Memorial and Cambridge Hospitals, the Massachusetts Industrial School for Crippled and Deformed Children and in various doctors' offices

Students who elect this course are those who after having two years of foundation work in physical education decide that their particular interest is in remedial work rather than in teaching. The value of physical therapy lies principally in the proper application of exercise, heat and massage and is used extensively in the aftermath of many diseases or accidents which leave an individual crippled or disabled.

### CORRESPONDENCE

#### A SUIT AGAINST A PHYSICIAN

October 2 1936

Managing Editor,  
*New England Journal of Medicine*

In reference to the article which appeared in the September 17 1936 issue of the *Journal*, a few days ago we received a letter from our assured the doctor involved in the case which we desire to have published in your next issue. His letter to us is as follows:

I am the doctor mentioned in 'A Suit Against a Physician' in the September 17 1936 issue of *The New England Journal of Medicine*. I now know that I have been represented at all times by the attorneys for the United States Fidelity and Guaranty Company at its expense and that all further defence by them is without cost to me. At the time the article appeared I was laboring under the erroneous impression that I might at some time have to pay personally for the defence which I am receiving and if the publication of the article based in part on my misconception has caused the United States Fidelity and Guaranty Company any harm, I am sorry.

I also now understand that so far I am charged only with having committed criminal acts, insurance against which would be unlawful but that if the plaintiff should later amend his declaration and prove that I had been negligent the disclaimer sent me would no longer operate and the Company would be liable for the judgment up to the first limits of my policy.

I am leaving the defence of my case in the hands of the attorneys for the United States Fidelity and Guaranty Company and see no reason to bring in personal counsel."

We are rather pleased that the matter has been brought to a head and we feel that the comments made by Mr Leland Powers, Attorney for the United States Fidelity and Guaranty Company outlining the facts in the case will provide a thorough understanding of cases such as this. As a matter of fact this is not a new problem inasmuch as that within two years a similar case was brought to the attention of the Society on account of another company reserving its rights under similar circumstances.

We have represented the United States Fidelity and Guaranty Company for a number of years and have handled, we believe to the satisfaction of our policyholders, hundreds of claims. In our dealings with this company we have always found them to be fair and honest.

Yours very truly,  
CROSBIE MACDONALD

79 Milk Street Boston

No 30 Federal Street  
Boston

September 29 1936

Managing Editor,  
*New England Journal of Medicine*,  
I am enclosing some comments on your editorial, 'A Suit Against a Physician' which I request that you publish in the *Journal*.

Very truly yours  
LELAND POWERS  
Attorney for United States Fidelity  
and Guaranty Company

The article 'A Suit Against a Physician' in the issue of September 17, 1936 contains an admirable statement of the facts of a case which I am defending as counsel for the United States Fidelity and Guaranty Company, but it also shows a misunderstanding regarding the legal limitation of the right to insure physicians and the extent to which an insurance company is permitted to furnish without expense a defense in certain cases. I have found this misunderstanding so common among members of the medical profession that I welcome this opportunity to tell Massachusetts doctors just what an insurance company can and cannot do in this state.

I think that the word "malpractice" is the cause of much of the confusion which exists, because the word is commonly applied not only to negligent acts but also to criminal acts. You can't insure against liability for criminal acts. Some years ago an insurance company endorsed policies to insure for damages on account of assault, slander, libel, undue familiarity and certain other things. The counsel for the Massachusetts Insurance Commissioner wrote the company, ordering them to eliminate this sort of coverage stating that 'contracts of insurance purporting to indemnify the insured in respect to illegal or criminal acts are contrary to public policy'.

The next source of misunderstanding is a failure to distinguish between the facts in a case as they will appear in evidence and what the plaintiff alleges in his declaration. From my investigation I feel certain that, in the case referred to, the facts are exactly as stated in the article but the plaintiff's declaration says something entirely different. It charges the doctor with false, malicious and wilful conduct, i.e., criminal act, and it does not charge him with (civil) malpractice error or mistake. Until this case is tried or the declaration amended, it stands as an accusation of crime, against which insurance is unlawful, and therefore the insurer must disclaim for any judgment which may be obtained against the doctor under the allegations of false, malicious and wilful conduct. It does not disclaim for allegations of civil malpractice which may be made by the plaintiff at any time up to trial or even during trial, and if the plaintiff amended and proved civil malpractice we would be liable for the judgment. I cannot emphasize too strongly that the nature of the action must be found from what the plaintiff claims and not from the true facts as they will be developed at the time of trial.

Since an insurance company cannot pay damages for criminal acts it was once suggested by a former Attorney General that it cannot furnish a free legal defense against claims for damages based on alleged criminal acts but because a plaintiff may change the entire nature of his cause of action by amendment, the actual alleged ground of liability may not be known until the trial is completed at which time an action commenced with allegations of crime may become an action charging only negligence, i.e. civil malpractice, which is covered by

the policy and which an insurance company must defend under its policy. Former Insurance Commissioner Brown therefore ruled that the insurance companies could and should furnish a free defense until a verdict should be found against the physician based on his alleged criminal acts.

So far as I know every insurance company writing malpractice insurance in Massachusetts has always furnished in civil actions a free defense of the doctor, no matter what the allegations in the declaration and the suggestion in the article that the doctor might have to pay personally for the defense which my office is furnishing is contrary to the well established practice of the insurance companies and is not supported by the wording of the disclaimer letter. As attorney for the United States Fidelity and Guaranty Company I personally defended at the sole expense of the Company several doctors charged with assault and battery.

Since physicians receive in the exercise of their functions the fullest insurance protection permitted by law, and since so far as I know no insured doctor in Massachusetts has ever had to pay personally a judgment based on a finding that he committed a criminal act, in my opinion there is no reason for suggesting that the medical profession should question the extent and quality of their insurance protection and service.

LELAND POWERS

## RECENT DEATHS

**SWEETSIR**—FREDERICK ELLSWORTH SWEETSIR, M.D., of Merrimac Massachusetts, died at his home 19 Main Street, September 29 1936.

Dr Sweetsir was born in Saco Maine, in 1866 and graduated from the Bowdoin Medical School in 1888. For a number of years he served on the school committee and was a vice president of the First National Bank of Merrimac a director of the local savings bank, a member of the Haverhill Medical Club and the staff of the Amesbury Hospital.

Dr Sweetsir was a Fellow of the Massachusetts Medical Society and the American Medical Association, and the Bethany Lodge of Masons.

His widow and a son Frederick survive him.

**BARNES**—WILLIAM LESTER BARNES, M.D., of 1557 Massachusetts Avenue Lexington, Massachusetts, died September 28, 1936.

Dr Barnes was born in Providence in 1878, graduated from Harvard College in 1900 and from the Harvard Medical School in 1904. He had served the town as school physician town physician and health officer and chairman of the board of health.

His medical affiliations were with the Arlington Medical Club and Fellowship in the Massachusetts Medical Society and the American Medical Association. His church association was with the Baptist Church.

Besides his widow, Dr Barnes is survived by

three sons, William L, Arthur W, and George S, all of Lexington, and a daughter, Mrs Etta A. Wyman, of Lynn His mother, Mrs Caddie E Barnes, and two sisters, Mrs Maude Morris and Miss Alice Barnes, all of North Attleboro, also survive him

## NOTICES

### ANNOUNCEMENT

SEYMOUR I NATHANSON, M.D., announces the opening of an office at 36 Prichard Street, Fitchburg Massachusetts

### MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p m on Thursday, October 15 in the Amphitheatre of the Peter Bent Brigham Hospital Dr Clifford L Derick Associate in Medicine Harvard Medical School and Senior Associate in Medicine, Peter Bent Brigham Hospital will give a medical clinic. To it are cordially invited practitioners and medical students

### SPECIAL SERVICE FOR PHYSICIANS AND MEDICAL STUDENTS

A Special Service for Physicians and Medical Students will be held in the Cathedral Church of St. Paul Boston (Tremont Street, opposite the Park Street Subway), on Sunday evening October 18 at 7 45 p m. Dr J M T Finney of Baltimore will speak on "Religion in Medicine" Bishop Sherrill will also speak briefly

Tickets for reserved seats may be procured through the Medical Association or by applying to Canon Trowbridge at St. Paul's Cathedral

#### SPONSORING COMMITTEE

Dr James H Means Chairman  
Dr Arthur W Allen  
Dr Alexander S Begg  
Dr Horace Binney  
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Dr Hardy Phippen  
Dr Warren R Sisson  
Dr Richard M Smith  
Dr Augustus Thorndike Jr  
Dr Kenneth J Tillotson  
Dr James Knight Wardwell  
Dr Conrad Wesselhoeft.

### MASSACHUSETTS MEMORIAL HOSPITALS

There will be a luncheon meeting of the Surgical Section in the Aid Association Room ground floor

Talbot Memorial 82 East Concord Street, Boston, on Friday, October 9 1936 at 12 noon

MILLO C GREEN *Secretary*

## NOTICES OF MEETINGS

### BOSTON CITY HOSPITAL

#### CONFERENCE OF CLINICAL PATHOLOGY

The monthly Conference of Clinical Pathology will be held at the Boston City Hospital, Pathological Amphitheatre, Wednesday, October 14, at 12 noon

### MASSACHUSETTS MEDICAL BENEVOLENT SOCIETY

#### ANNUAL MEETING

The Annual Meeting will be held at the Boston Medical Library at 5 15 p m, on Thursday, October 22

The Council will meet at the same place at 5 00 p m. It includes the following officers President, Vice-President Treasurer, Secretary and the following Trustees Lincoln Davis G S C Badger, W B Robbins Reginald Fitz Elliott C Cutler Arthur W Allen Lloyd T Brown, Charles C Lund and Charles G Mixer

ROBERT M. GREEN, M.D., *President*,  
HILBERT F DAX, M.D., *Secretary*

### HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheatre (Shattuck Street Entrance), Tuesday evening, October 13, at 8 15 p m

#### PROGRAM

Presentation of Cases  
An Anthropologist in the Medical School. By T Wingate Todd Henry Willson Payne Professor of Anatomy Western Reserve University School of Medicine Cleveland

Medical students and physicians are cordially invited to attend

MARSHALL N FULTON, M.D., *Secretary*

### NORFOLK DISTRICT MEDICAL SOCIETY

#### PROPOSED 1936-1937 MEETINGS

October 27 8 15 p m St Elizabeth's Hospital. Communications and Case Presentations by the Staff Details of program to be announced

November 24 8 15 p m The Beth Israel Hospital Communications and Case Presentations by the Staff Principal subject—Cardiology Details of program to be announced.

January 19 1937 8 15 p m. The Peter Bent Brigham Hospital Communications and Case Presentations by the Staff Suggested title—'Abdominal Pain from the Medical and Surgical Standpoint.' Details of program to be announced.

February 23 1937 Time place and details of program to be announced

March 30 1937 8 15 p m New England Deaconess Hospital A Symposium on Diabetes entitled 'A Survey of the Diabetic Work of the George F Baker Clinic in the New England Deaconess Hospital Communications and Case Presentations by the Staff Drs Elliott P Joslin, Howard F Root, Priscilla White, Alexander Marble and Allen P Joslin

May 1937 Annual Meeting Details to be announced

The Secretary on behalf of the Society and its Executive Committee desires to express appreciation to the Physicians, Surgeons, Hospital Executives and others who have so kindly consented to assist us in connection with the above program

FRANK S CRUICKSHANK, M.D., *Secretary*  
1247 Beacon Street, Brookline

NOTE The Censors will meet for the examination of candidates on the first Thursday of November, 1936 and May, 1937 Fee of \$10.00 is payable at the time of examination Application blanks may be obtained by writing the Secretary furnishing name, address and name of school of graduation in medicine Application must be made at least three weeks prior to date of examination Candidates whose applications are on file will receive proper notices

#### SOUTH END MEDICAL CLUB

The next regular meeting of the South End Medical Club will be held on Tuesday October 20 at 12 noon, at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston The speaker will be LeRoy A Schall, M.D., Surgeon, Massachusetts Eye and Ear Infirmary, Assistant Laryngologist at the Robert B Brigham, Palmer Memorial, and Collis P Huntington Memorial Hospitals Consultant, United States Marine Hospital, No 2 Consultant, Tumor Clinic Boston Dispensary His subject will be 'Upper Respiratory Infections' All physicians are cordially invited to attend

#### ACADEMY OF PHYSICAL MEDICINE

The Academy of Physical Medicine will hold its Annual Meeting in Boston, Massachusetts, at the Hotel Statler on October 20, 21 and 22, 1936

The corrected program\* is educational in character and contains symposia and reports on the newer studies and clinical developments in physical medicine presented by recognized authorities in medicine and the basic sciences

The three-day program will open with reports of the standing committees and of special surveys by Dr William F Roberts Minister of Health St. John N B, Dr Franklin P Lowry Newton Mass, and Dr William D McFee, Boston followed by addresses on the physics and biology of Physical Medicine by E Leon Chaffee, Ph.D, Gordon McKay Professor of Physics and Communication Engineering Har-

vard University Dr Byron Sprague Price of New York and Dr Heinrich Brugsch of Tufts College

At 12 o'clock, noon, Dr Frank Hammond Krusen, Mayo Clinic, Rochester, Minn, will present the Presidential Address on 'The Present Status of Physical Medicine'

The afternoon session will open with an address by Dr Winfred Overholser, Commissioner, Massachusetts Department of Mental Diseases, and a paper by Dr William Benham Snow, New York, followed by a Fever Therapy Symposium in which Drs Frank H Krusen Robert E Peck, Clifton T Perkins, Harry Solomon, Clarence A. Neymann and Hudson Hoagland, Ph.D, Clark University, will participate In the evening Dr Stafford L Warren Strong Memorial Hospital, Rochester, N Y, will present the Arthur H Ring Foundation Lecture 'Fundamental Principles Concerned in the Treatment of Gonococcus Infections by Artificial Fever Therapy'

On the second day a Symposium on Physical Education under the Chairmanship of Dr R Taft McKenzie of Philadelphia will include Harold T Edwards, A.A., Harvard Fatigue Laboratory, Josephine Rathbone, Ph.D, Teachers College, Columbia University Dean Ernst Hermann, Sargent College and Sir Robert Stanton Woods of London Papers on orthopedic subjects will be presented by Drs Frederic Jay Cotton and Gordon M Morrison of Boston and Dr Fred H Albee of New York, Drs Abraham Myerson H Houston Merritt and Isador Coriat will present subjects in neuropsychiatry Dr Rebekah Wright will discuss hydrotherapy technique Clinical papers will be presented by Dr Mary Arnold Snow New York Dr Claude L Payzant, Boston, and William J Schatz Allentown, Pa.

On Thursday, October 22, a Dermatological Symposium under the Chairmanship of Dr Francis P McCarthy will include Drs Francis M Thurmon, William J Macdonald William Boardman Austin W Cheever and C Guy Lane of Boston The Academy will be addressed by L L Campbell, Ph.D Professor of Physics Simmons College on 'The Radiation Energy of the Electromagnetic Spectrum' A motion picture by Dr A. Rollier Leysin, Switzerland, 'Heliotherapy and the Work Cure at the International Factory Clinic at Leysin' will be shown Papers on radiological subjects on physical medicine in gynecology and in gastroenterology will be presented by Dr J Gershon Cohen Philadelphia William D McFee Charles W McClure and Herman A. Osgood Boston An Electrosurgical Symposium will be conducted by Dr Benedict F Boland Drs Lester R. Whitaker, Prodomos Papas and DeWitt G Wilcox of Boston and William H Schmidt of Philadelphia will participate

An informal dinner at the Ring Sanatorium is scheduled for Tuesday evening October 20 The Annual Academy Banquet will take place on Wednesday evening October 21, at the Hotel Statler

An elaborate program has been arranged for the visiting ladies

All members of the medical profession are cordially invited to attend. A program will be mailed on request. William D. McFee, M.D., Chairman, Executive Committee, 41 Bay State Road, Boston, Mass. Franklin P. Lowry, M.D., Secretary, Treasurer, 313 Washington Street, Newton, Mass.

### ARLINGTON DOCTORS' CLUB

The regular meeting of the Arlington Doctors Club will be held in the Nurses' Home, Symmes Arlington Hospital, Tuesday evening, October 13, at 8:30 p.m.

The speaker will be Dr. Joe V. Meigs.

The subject will be 'Early Diagnosis of Cancer of the Breast and Uterus.' His talk will be illustrated by lantern slides.

The discussion will be opened by Dr. Fred Lynch.

All physicians are invited to attend.

FRANK H. GERRY, *President*

SIDNEY M. SIMONS, *Secretary*

### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, OCTOBER 12, 1936

##### Tuesday, October 13—

- \*9 a.m. - 10 a.m. Boston Dispensary, 25 Bennett Street. Boston. Diagnosis and Management of Pelvic Inflammatory Disease. Dr. L. E. Phaneuf.
- \*8:15 p.m. Harvard Medical Society. Peter Bent Brigham Hospital Amphitheatre.
- \*8:30 p.m. Arlington Doctors Club. Nurses Home, Symmes Arlington Hospital.

##### Wednesday, October 14—

- \*9 a.m. - 10 a.m. Boston Dispensary, 25 Bennett Street. Boston. Hospital Case Presentation. Dr. S. J. Thannhauser.
- \*11:2 m. Clinico-Pathological Conference. Children's Hospital Amphitheatre.
- \*12 m. Boston City Hospital. Conference of Clinical Pathology. Pathological Amphitheatre.

##### Thursday, October 15—

- \*9 a.m. - 10 a.m. Boston Dispensary, 25 Bennett Street. Boston. Measles Prevention. Dr. Robert W. Buck.
- \*3:30 p.m. Medical Clinic. Peter Bent Brigham Hospital.

##### Friday, October 16—

- \*9 a.m. - 10 a.m. Boston Dispensary, 25 Bennett Street. Boston. Agranulocytosis. Dr. William P. Murphy.
- \*12 m. Massachusetts General Hospital. Clinical meeting of the Staff of the Children's Medical Service. Ether Dome.

##### Saturday, October 17—

- \*9 a.m. - 10 a.m. Boston Dispensary, 25 Bennett Street. Boston. Hospital Case Presentation. Dr. S. J. Thannhauser.
- \*10 a.m. - 12 m. Staff Rounds at the Peter Bent Brigham Hospital. Conducted by Dr. Henry A. Christian.

##### Sunday, October 18—

- \*7:45 p.m. Special Service for physicians and medical students. Cathedral Church of St. Paul, Boston (Tremont Street opposite Park Street subway).

\*Open to the medical profession.

†Open to Fellows of the Massachusetts Medical Society.

October 8—The Edward K. Dunham Lectureship. Harvard Medical School Amphitheatre, Building C, at 5 p.m. See page 565, issue of September 17.

October 8—New England Society of Psychiatry. Brattleboro Retreat, Brattleboro, Vermont.

October 8—Fenwick Association of Physicians. Hotel Bartlett, 95 Main Street, Haverhill, at 8:30 p.m.

October 9—Massachusetts Memorial Hospitals. Luncheon Meeting of Surgical Section. See page 691.

October 12-16—Twenty-First International Assembly of the Inter-State Post-Graduate Medical Association. See pages 565 and 566, issue of September 17.

October 12-18—Third International Congress on Malaria. See page 1076, issue of May 21.

October 13—Harvard Medical Society. See page 691.

October 13—Arlington Doctors Club. See notice elsewhere on this page.

October 14—Boston City Hospital. Conference of Clinical Pathology. See page 691.

October 15—Medical Clinic at the Peter Bent Brigham Hospital. See page 691.

October 16—The Celebration of the Use of Ether. Massachusetts General Hospital. See page 689.

October 18—Special Service for Physicians and Medical Students. See page 691.

October 19-23—Clinical Congress of the American College of Surgeons. See page 180, issue of January 23.

October 19-31—1936 Graduate Fortnight of the New York Academy of Medicine. See page 1221, issue of June 11.

October 20—South End Medical Club. See page 692.

October 20-22—Academy of Physical Medicine. Annual Meeting. Hotel Statler, Boston. See page 692.

October 20-23—The American Public Health Association. See page 1226, issue of June 11.

October 22—Massachusetts Medical Benevolent Society. Annual Meeting. See page 691.

November 16—One hundredth anniversary of the founding of the Army Medical Library, 7th Street and Independence Avenue, S.W., Washington, D.C.

December 3-5—Annual Conference of the National Society for the Prevention of Blindness, Columbus, Ohio.

March 30 - April 2, 1937—First International Conference on Fever Therapy. Postponement notice. See page 52, issue of July 2.

April 21-24, 1937—American Society for Experimental Pathology. See page 1075, issue of May 21.

### DISTRICT MEDICAL SOCIETIES

#### FRANKLIN DISTRICT MEDICAL SOCIETY

Will meet at the Weldon in Greenfield at 11 a.m. the second Tuesdays of November, January, March, and May.

CHARLES MOLINE, M.D., Secretary

Sunderland

#### MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

November 18—Bear Hill Golf Club, Stoneham.

January 13, 1937—Bear Hill Golf Club, Stoneham.

March 16, 1937—Danvers State Hospital, Danvers.

May 11, 1937—Bear Hill Golf Club, Stoneham.

KENNETH L. MACLACHLAN, M.D., Secretary

1 Bellevue Avenue, Melrose

#### NORFOLK DISTRICT MEDICAL SOCIETY

October 27, May, 1937—See page 691.

#### PLYMOUTH DISTRICT MEDICAL SOCIETY

October 15—11 a.m. at the Moore Hospital, Brockton.

FRED F. WEINER, M.D., Secretary

231 Main Street, Brockton

#### WORCESTER DISTRICT MEDICAL SOCIETY

October 14—Rutland State Sanatorium, Rutland, Mass.

6:15 p.m. Dinner—complimentary by the State Hospital.

7:30 p.m. Business session and scientific program.

November 5—At 4:30 in the rooms of the Worcester Medical Library, Inc., at 34 Elm Street, Worcester will be held the fall Censors meeting.

November 11—Grafton State Hospital, North Grafton, Mass.

6:15 p.m. Dinner—complimentary by the hospital.

7:30 p.m. Business session and scientific program.

December 8—St. Vincent Hospital, Worcester, Mass.

6:15 p.m. Dinner—complimentary by the hospital.

7:30 p.m. Business session and scientific program.

January 13, 1937—Worcester City Hospital, Worcester, Mass.

6:15 p.m. Dinner—complimentary by the hospital.

7:30 p.m. Business session and scientific program.

February 10, 1937—Worcester State Hospital, Worcester, Mass.

6:15 p.m. Dinner—complimentary by the hospital.

7:30 p.m. Business session and scientific program.

March 10, 1937—The Memorial Hospital, Worcester, Mass.

6:15 p.m. Dinner—complimentary by the hospital.

7:30 p.m. Business session and scientific program.

April 14, 1937—Worcester-Hahnemann Hospital, Worcester, Mass.

6:15 p.m. Dinner—complimentary by the hospital.

7:30 p.m. Business session and scientific program.

May 6, 1937—At 4:30 in the rooms of the Worcester Medical Library, Inc., at 34 Elm Street, Worcester will be held the spring meeting of the Board of Censors.

Wednesday Afternoon and Evening, May 12, 1937—Annual Meeting. Time and place for this meeting will be announced in an early spring issue of the Journal.

ERWIN C. MILLER, M.D., Secretary

27 Elm Street, Worcester





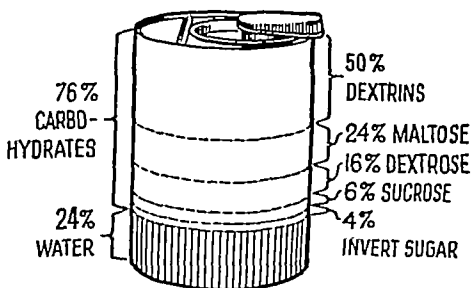
## ...THE TRIPLE TEST IN PRACTICE!

THE ETERNAL TRIANGLE dominates the lives of products, even as of men. In infant feeding the doctor is concerned with the three factors—*composition, concentration and cost!*

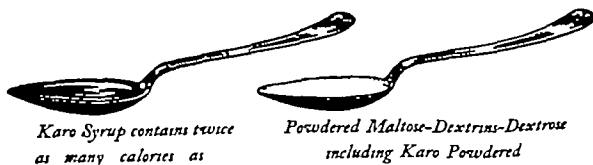
Apply the triple test in your practice. Let us now put it to Karo.

(1) **Composition** When you prescribe Karo as the milk-modifier you are providing well-tolerated, readily digested maltose-dextrins-dextrose. The dextrins are non-fermentable, the maltose rapidly transformed to dextrose requiring no digestion, the sucrose added for flavor is digested to monosaccharides. Karo is prepared chemically superior, bacteriologically safe—non-allergic, practically free from protein, fat and ash.

(2) **Concentration**—When you consider that volume for volume, Karo Syrup furnishes *twice* as many calories as a similar sugar modifier in powdered form, you realize *how* strongly saturated Karo is in calories of maltose-dextrins-dextrose. A tablespoon of Karo Syrup yields 60 calories while a tablespoon of powdered maltose-dextrins-dextrose gives 29 calories. Karo Syrup is a concentrated milk-modifier!

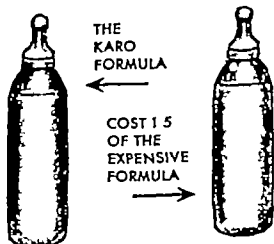


(3) **Cost**—When you prescribe Karo you help the family out of the economic dilemma.



Karo costs  $\frac{1}{5}$  of the expensive carbohydrates, slashing the high cost of infant feedings. The maltose-dextrins-dextrose of Karo are marketed as a food. The saving is 80%. The Corn Products

Refining Company charges for the constituents of Karo and nothing extra for the good name. Apply the triple test to milk-modifiers and you will find Karo desirable in composition, rich in calories, and inexpensive. Karo consists of dextrins, maltose and dextrose (with a small percentage of sucrose added for flavor).



Corn Products Consulting Service for Physicians is available for further clinical information regarding Karo. Please Address: Corn Products Sales Company, Dept. BJ10, 17 Battery Place, New York City.



# The New England Journal of Medicine

VOLUME 215

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NUMBER 16

## RELATIONSHIP OF PSYCHIATRY TO MEDICINE\*

By WILLIAM A. BRYAN, M.D.†

"FOR where there is love of man, there is also love of the art. For some patients, though conscious that their condition is perilous, recover their health simply through their contentment with the goodness of the physician."<sup>1</sup> This oft-repeated quotation from the Hippocratic precepts shows the early recognition by the writer, whoever he may have been, of the importance of the relationship of mind and body.

Many physicians of today are quite willing to admit their lack of knowledge of psychiatric matters. I mention this not with the idea of condemning those who accept this state of affairs but rather that I may offer an explanation of its development. Most of my listeners doubtless received the same kind of psychiatric instruction in medical school that was given to me, a series of eight or ten lectures dealing with the symptoms of the psychoses, a visit to a state hospital and possibly to a school for the feeble-minded. In these institutions we saw clinical demonstrations of the most exaggerated types of the psychoses and feeble-mindedness. Most of the monstrosities in the institution were revealed for our edification. Not infrequently these demonstrations assumed the aspects of a circus side show. Such clinics did little more than develop in the minds of the students an attitude of futility in attempting anything therapeutic for such social outcasts. In some of us such performances engendered a feeling of sympathy for the patients, in others, much as they may have tried to avoid it, a sensation of disgust. Of course, teaching of the sort described is poor pedagogy. Professors of psychiatry were not wholly to blame for this type of instruction. We are well aware of the fact that deans of medical schools are constantly under pressure to allot more time to the various specialties. Psychiatry has, for many decades, been the stepsister of medicine. The psychoses are not of themselves diseases which cause death, and many of them are essentially chronic in nature. The average practitioner probably will not see many cases of the frank psychoses. But what he will encounter is a multitude of borderline cases and neuroses. Therefore with the

situation as it has been, requests for the teaching of a somewhat nebulous subject were usually of little avail.

During the past five years, under the guiding hand of the National Committee for Mental Hygiene, a determined effort has been made to set up minimum standards of psychiatric instruction in the medical schools of the United States. Instead of waiting until the last year to begin instruction in psychiatry, many schools are taking cognizance of a fact which I believe to be of paramount importance, namely, that the teaching of this subject must be started in the first year with basic instruction in medical psychology, in exactly the same way anatomy and physiology are taught as preliminaries to other clinical subjects. To a certain extent it becomes a question of conditioning a student to a receptive attitude.

In a recent article, Dr. William A. White<sup>2</sup> has summarized the problem in his usual succinct manner, "The real difficulty is in translating psychological mechanisms into terms that are immediately comprehensible to those who have been engaged in studying the usual problems of what I call by contrast, somatic medicine."

To many physicians psychiatry consists largely of the hospitalization of mental patients for the protection of both the patient and society. So far as hospitalization is concerned, psychiatry represents the most conspicuous example of state medicine. In the United States more than 96 per cent of the hospital beds for mental patients are under governmental control. To give you a correct picture of the hospital problem in Massachusetts, I quote from the Annual Report of the Commissioner of Mental Diseases for the year ending November 30, 1934. In the twelve mental hospitals under the jurisdiction of the department and in the institution for epileptics at Monson there were 20,283 patients under treatment. In the three state schools for the feeble-minded there were an additional 4,933 patients. In all the mental institutions of the state there were 28,952 patients. On the books of these hospitals there were 31,501 patients. In the fiscal year 1934, 6,824 patients were admitted, of whom 5,304 were new admissions and 1,520 were re-admissions. With the majority of patients in a poor or marginal economic status, it is not difficult to understand why the victims

Delivered at the Annual Meeting of the Worcester District Medical Society May 13, 1936.

†Bryan, William A.—Superintendent, Worcester State Hospital. For record and address of author see "This Week's Issue" page 74.

of frank psychoses are now almost entirely a problem for state medicine. I have quoted these figures to impress upon you the importance of mental diseases as a public health problem and as a preliminary to the next step in my thesis.

Psychiatry does not deal only with hospitalized cases. One of the grave objections to the hospitalization of mental patients is the idea of relatives that the family is stigmatized by such a procedure. The utter unreasonableness of this attitude can easily be shown. It is a "throw-back" to antiquated notions that mental disease represents a punishment for sins committed. It is the old theory of diabolical possession. It also means, to some extent, a natural reaction to the more recent idea that these diseases are due to heredity. Modern studies in heredity reveal little sound or conclusive evidence in favor of this being an all-important factor in the psychoses. This is the reason for the objection on the part of careful students of eugenics to the wholesale sterilization of mental patients. Our knowledge of the major etiologic factors in mental disease is not so all inclusive as to permit us to be too dogmatic in our statements, but certainly there is no more basis for a relative's feeling a sense of shame when a mental disease develops in the family than when any other kind of disease occurs.

One method of helping the situation is through the use of psychiatric wards in general hospitals. The Massachusetts General in Boston and the Presbyterian Hospital in New York are examples of this trend. Many city hospitals have their psychiatric departments, the outstanding examples in this country possibly being Bellevue in New York and the Philadelphia General. In these institutions splendid co-operative work between various departments has resulted in a better understanding of problems which have bothered physicians for years.

Dr. Helen Flanders Dunbar<sup>2</sup> in her book "Emotions and Bodily Changes" reviewed 2,251 articles and books published between 1910 and 1933 dealing with psychosomatic relationships. Even in this splendid work the literature is by no means exhaustively surveyed. Many clinicians are realizing the importance of considering the patient as something more than an aggregate of cells and are writing stimulating, thought-provoking articles on the subject. Dunbar says, "Throughout all the phases of biological research there is evidence of the same transition from the premise that the whole could be understood by a study of the parts to a new emphasis on the whole."

As a result of her investigations Dunbar noted that thinking among physicians regarding psychosomatic relationships falls into three groups: first, the idea that all psychic manifestations are brought about by an organic condition, second-

ly, the antithesis to this thought, overlooking the organic condition in favor of a psychic etiology, and finally, the acceptance of the presence of both psychic and organic pathology in a given patient. This is the psychosomatic point of view, with its emphasis on the concept of the organism as a whole.

As evidence of the first type of thinking, the development of general paresis is often given. We have in this disease a definite etiology, the *Treponema pallidum*. It operates in a destructive way on the frontal lobe of the brain. Many years ago Osler said that to know all there is to know about syphilis is to know all medicine. The mental symptoms of dementia paralytica are as protean as are the physical manifestations of lues. One patient may be manic, another depressed, one may develop a paranoid reaction type, another be expansive, one may rapidly deteriorate and another rapidly recover. Why should these patients with the same etiologic factor develop such varying clinical pictures? Many things enter into the picture and researches are being made to clarify this problem. We have, however, sufficient information to make us believe that the major reasons for the various symptomatologies present are to be found in either the original physical endowment of the patient or the effects of conditioning brought about by environmental factors.

The second type of thinking, in which the psychic factor is the only etiologic cause in producing disease, receives little following among physicians. Among quacks, charlatans, and adherents of Christian Science and other cults, however, it does assume importance. We cannot get away from the fact that many so-called "cures" follow the ministrations of these groups.

The danger of falling into the fallacious type of reasoning, "after it, therefore because of it," is in marked evidence here. Most physicians have, at some time in their careers, been guilty of this same error in reasoning. Medicine is filled with it. The healing power of nature must always be taken into consideration in evaluating therapeutic remedies. It should also be remembered that the statistics of the early hospitals accepting and practicing the Hahnemannian principle of "like cures like" were much more satisfactory than those of the allopathic practitioners, prior to their therapeutic reforms. One wonders if the personalities of the old homeopaths did not have much to do with their therapeutic triumphs and whether they did not practice an unconscious form of psychotherapy.

Among psychiatrists of today there seems to be a general acceptance of the concept of the organism as a whole. They believe that disease cannot be considered entirely in terms of either the organic or psychic, but that to understand fully the clinical picture the organism must be

considered as a unit Both psychic and somatic factors must be evaluated Disease is not only a pathologic process but it is an experience in life and like all experiences we just adjust to it emotionally This adjustment in the case of a minor pathologic condition is relatively easy, but when we think of this emotional adjustment in a case of tuberculosis or cancer, the matter becomes more difficult and complicated And yet this emotional adjustment affects the pathologic situation

The pediatric and psychiatric departments of the Johns Hopkins Hospital have been working in close co-operation for several years, with very satisfactory results The study of these emotional problems requires a considerable investment of time on the part of the physician for their solution A co-operative study by internist and psychiatrist would divide this labor and give better therapeutic results than could be attained by either working alone

As a concrete problem, take the subject of enuresis Many children suffering from this condition have no demonstrable organic lesion to account for their difficulty The diagnosis is frequently enuresis, cause undetermined These cases require many hours of patient investigation and hours of training before the unhappy habitual tendency of the patient is overcome This is what is meant by looking at the problem from the concept of the organism as a whole What of the reaction of the patient to environmental factors? What of the patient's mental response to exogenous or endogenous stimuli and the physiologic changes which we know occur in the organism as a result of these stimuli? What of the factors which occurred in the child's past which may have played a rôle in the development of the enuresis? Is the enuresis an attention-gaining mechanism? Is the child unconsciously or consciously punishing the parents? These are only a few of the questions which should be answered in studying the patient when bearing in mind the concept of the organism as a whole, the psychosomatic approach

Schwarz<sup>4</sup> considers enuresis as only one factor in a complicated psychic situation, therapy of the condition becomes prophylaxis against a later neurosis of which this symptom may be the first evidence both being produced by the same emotional disturbances If this be true, what an opportunity our pediatricians have to do sound, preventive psychiatric work.

It is true, however, that enuresis may be cured by local measures It does not necessarily follow that the enuresis is always due to a local condition, and by the same token it need not be due to a psychic condition Both sides of the problem should be investigated

That emotional disturbances may affect laboratory findings is now a matter of common

knowledge One of the tests which is commonly affected is the basal metabolic rate It has been our experience that we are hardly ever warranted in accepting at face value a first determination of the rate of oxygen consumption A patient may give all indications of being in a true basal state so far as external appearances are concerned and yet may be in a turmoil of seething emotions internally Under such circumstances a patient with a markedly lowered basal metabolic rate may give an entirely misleading normal rate

As pointed out by Ziegler and Levine,<sup>5</sup> working with psychoneurotic war veterans, more than ten years ago "To the casual observer the majority of these patients would have been considered during the test as lying still on the bed Furthermore some patients who showed increase in metabolism and practically no objective reactions were not aware of any emotions whatsoever The mere fact of a patient lying quietly in bed is no assurance of a state of rest" From our experience with both mentally normal and abnormal patients we can attest to the value of this implied warning

Emotional glycosuria is a not uncommon phenomenon and the diagnosis of diabetes mellitus has been made more than once because of lack of consideration of this emotional factor Anxiety tends to produce an increase in blood sugar Several authors have emphasized the necessity for more adequate consideration of the psychic factors in diabetes mellitus There seems to be little doubt that people of the so-called "nervous" temperament are more prone to develop diabetes than are others of a more phlegmatic temperament There are many interesting cases in the literature of significant improvement in patients placed under conditions of psychic quiet and exacerbations when undergoing psychic excitement

There are many physical conditions in which a psychic component is well recognized It might be of some value to review some of these briefly as a means of emphasizing the importance of the concept of the organism as a whole and the therapeutic implications

In a study of five thousand cases of Graves' disease Bram<sup>6</sup> found that approximately 90 per cent presented a clear history of psychic trauma which significantly preceded the disease In 4 per cent a history of general or focal infection was the possible exciting cause of the disease In 3 per cent the ingestion of iodine or thyroid extract was regarded by the patients as the cause of the symptoms Bram felt that in most cases where infections appeared to serve as the exciting cause and in those cases in which no exciting cause was discovered, an undisclosed psychic trauma may have preceded the syndrome It appears that inherent predisposition is a prerequisite to sensitivity to psychic

traumata." He likewise states that "Individual sensitivity to psychic traumata varies qualitatively and quantitatively."

The removal of the psychic precipitating factor, combined with rest, is often sufficient to effect a cure without recourse to surgery. Crile's method of anoci-association in which he "steals" the operation is a concession to the importance of the psychic factors in operative treatment of the condition. There are authentic cases in the literature of cure of exophthalmic goitre by means of psychoanalysis. I have seen a physician friend lose many pounds in weight, develop tremors, and show marked acceleration in oxygen consumption accompanied by enlargement of the thyroid gland who, when the psychic precipitating factor was no longer operative, promptly lost all symptoms and made a complete recovery.

The heart is another organ which is particularly subject to the stresses and strains of emotional life. Attaching a subject to a cardio tachometer and giving him a simple problem of addition to solve is often sufficient to increase the heart rate twenty or thirty beats per minute. Even the anticipation of a task is often sufficient to produce a marked acceleration in the heart rate.

In cardiac patients, as emphasized by numerous authors, psyche and soma are particularly closely intertwined. A correct analysis of the patient's psyche may mean the difference between a cardiac neurotic and a continued useful citizen. We are all familiar with the disastrous results which may happen to a case of angina pectoris if exposed to a trying emotional situation. Considerable work has been done with hypnosis in trying to determine psychic factors in the precipitation and perpetuation of hypertension. Several authors have expressed the belief that an experience which is no longer in consciousness may produce the same sensations as at the time of its first happening. L. A. Conner's<sup>7</sup> excellent articles dealing with psychic factors in cardiac conditions contain practical advice worth acting upon.

Bronchial asthma has taxed the patience of most physicians. The number of remedies still used in its treatment make the inquiring physician wonder if psychotherapy may not serve as a useful adjunct to drug therapy. O. Fenichel<sup>8</sup> believes the behavior of these patients, apart from their asthmatic symptomatology, to be that of a compulsion neurosis. Moos<sup>9</sup> reports the recovery of sixteen asthmatics with disappearance of Charcot-Leyden crystals and Curschmann's spirals and a return to normal of the blood eosinophil count following psychotherapy. Exposures of these patients to the supposed specific allergen did not result in further attacks.

The intimate relations of psychic factors and

gastrointestinal pathologic conditions have been recognized for centuries. It has only been during the past decade, however, that psychiatrists have worked with internists in clinics in co-operative efforts to remedy the conditions. "Nervous dyspepsia" in the 1880's was a well recognized clinical entity. It is a matter of common knowledge that anxiety or worry will cause exacerbations of gastric ulcer. In these nervous dyspepsias, so called, we always find psychic concomitants. It is as essential in the proper treatment of these conditions to treat the accompanying psychologic condition as it is to place the patient on dietary or drug treatment. Dreyfus<sup>10</sup> believes that nervous dyspepsia is not a gastric disease, that the gastric symptoms, although they may completely dominate the picture, are of a secondary nature.

Cushing's<sup>11</sup> comparatively recent work on the relationship of peptic ulcer and the interbrain is thought-provoking, if not all-inclusive. He concluded in part on the basis of his experiments as follows: "So it may easily be that highly strung persons, who incline to the form of nervous instability classified as parasympathetic (vagotonic), through emotion or *repressed emotion*, incidental to continued worry and anxiety and heavy responsibility combined with other factors such as irregular meals and excessive use of tobacco, are particularly prone to have chronic digestive disturbances with hyperacidity often leading to ulcer, effects wholly comparable to those acutely produced."

Another gastrointestinal condition which has baffled many competent internists is mucous colitis. Most gastroenterologists are agreed that nervous manifestations are usual concomitants of the condition. Thorough investigation of these patients will usually reveal a close relationship between a trying psychologic situation and the onset of symptoms. Psychotherapy frequently is effective in the treatment of this disorder.

Both spastic and atonic constipation are frequently accompanied by neurotic manifestations. Visceroptosis has its psychic components. It is interesting that the incidence of nephropexy and fixations of various sorts are steadily declining. Surgeons are realizing that there is something more to the problem than "hitching up" a fallen viscus.

Nearly every experienced obstetrician recognizes the value of suggestion in hyperemesis gravidarum. The psychic difficulties present in most of these cases are of a rather superficial type and usually respond satisfactorily to such simple psychotherapeutic measures as suggestion. Naturally this statement does not hold true for patients who have been permitted to vomit for months and are in a highly toxic state. A condition not infrequently encountered by

the genito-urinary specialist is impotence. By far the majority of these cases have a predominantly psychic origin. Diuresis is a frequent concomitant of anxiety states. One of the most common disturbances the gynecologist is called upon to treat is dysmenorrhea. In the last edition of Merck's Manual, some thirty-five remedies are suggested for this condition. The fact that many of these remedies are highly effective the first time used but nearly worthless the next time should make us think of the probability that the therapeutic efficacy of our remedy is based essentially on the power of suggestion. Benzyl benzoate, viburnum prunifolium, cimicifuga, ovarian extract, all have their adherents, but I have often wondered if a little water flavored with asafetida plus a liberal supply of suggestion as an adjuvant would not make a better remedy. Please do not misunderstand me in this matter, there are types of dysmenorrhea in which I am convinced that suggestion would be about as valuable in treating the condition as nothing at all.

In 1930 Derby,<sup>12</sup> speaking of ocular neuroses made the observation that in his opinion ophthalmologists produce more neuroses than they cure. He says, "Too often the neurotic patient is dismissed or got rid of with a minor change in his prescription when what he really needs is a careful analysis of his condition and an explanation of how his various aches and pains should be interpreted and treated." He believes that in 95 per cent of the patients who are constantly coming to ophthalmologists for changes in glasses, a trained psychologist is not needed for either diagnosis or treatment. He believes that the ophthalmologist can handle the neurotic condition. In his experience, fear of injuring the eyes is the major factor, and the desire to escape unpleasant situations occurs in fewer cases. Again the fact that minor changes in the prescription produce a temporary cure is a clue to the actual situation. Desire for attention is another factor which must be given consideration in this type of case. Several authors have commented on the occurrence of certain cases of conjunctivitis which resist therapeutic measures because of their essential psychic etiology. The influence of pathology of the eye on the psyche is much more important, perhaps, in the majority of cases than the influence of psychic factors on the development of eye conditions. Both, however, should be considered. Hysterical amblyopia is met with occasionally. The treatment of this condition is usually rather easy for a trained psychiatrist. It should be remembered that the mere clearing up of the symptom, however, which can be done relatively easily by means of suggestion or hypnosis, is not the whole story. It usually is necessary to probe deeper and to get at the fundamental etiology of the condition in order to effect a permanent

cure. Otherwise the original symptom will often be replaced by another.

Psychogenic deafness and other psychogenic ear disturbances are relatively common, and a very large literature has developed in this field. In the field of dermatology more and more attention is being paid to psychogenic factors in the understanding and treatment of these conditions. It has been demonstrated repeatedly that skin blisters can be produced hypnotically, with the exclusion of all sources of error. All dermatologists recognize obvious psychogenic types of pruritus and urticaria. The psychogenic element entering into dermatology should perhaps receive more consideration than it has in the past. In Dunbar's book some thirty-seven pages are devoted to abstracts of the literature pertaining to psychic factors in the production of skin conditions.

It will be recognized in this discussion that I have said very little that is new. I have selected rather obvious illustrations intentionally from the various specialties of medicine. Many specialties are not even considered, although an extensive literature is available for those who are interested in nearly every field of medicine. All of us, while students in medical school, received definite instruction to "treat the patient and not the disease." It is my contention, however, that to this ideal most of us render little more than lip service. It takes time to delve into the trials and tribulations of our individual patients, and to many of us, often because of our earlier training, it seems rather futile to waste our time in listening to long-drawn-out descriptions of physical ailments. Too often do we label these patients neurotics and treat them with placebo therapy. In my opinion this is one, and perhaps not the least important, reason why many of the neurotics find themselves in the hands of various cultists and charlatans. Would it not be far better for us to practice psychotherapy in these cases intelligently than practically to invite their going to unscientifically trained people for their treatment? If we are unable either by temperament or because of the time factor to treat these patients ourselves, would it not be better to refer them to our confrères, the psychiatrists? It is my carefully considered opinion that no physician, no matter what specialty he represents, will not be able to render a better type of medical service provided he adds to his therapeutic armamentarium a basic knowledge of medical psychology.

Dr Miller,<sup>13</sup> in his presidential address to the American College of Physicians, spoke on "The Changing Order in Medicine." Coming as that does from one of the most distinguished physicians in the country, his comments relating to psychiatry as it touches on medicine will bear repeating *in extenso*. May I quote him verbatim.

"Perhaps the lack of intimate personal contact which we have lost in the passing of the family physician is a factor in the situation. But whatever may be the explanation, is it not true that we as physicians, under the influence of our passion for modern and exact science have lost sight of those more intangible and less demonstrable factors which we call the nervous and the psychic? Not only in the prevention of actual nervous or mental disorders is this factor important but also in the treatment of our patients suffering from any disease, particularly the chronic disorders. A better recognition of the importance of their mental processes would appear to be demanded which would bring us back to a fundamental appreciation of our patients as individuals rather than as cases of disease, and to an understanding of their personalities and the influences under which those personalities have developed and are manifested. Is it not at least partly true that the extraordinary development of cults of faith and mental healing in this country, estimated to affect approximately ten millions of our people directly or indirectly, may be attributed to a lack of interest in and appreciation of these factors by the practicing medical profession? Personally I have a very strong feeling that as a whole we of the profession are constantly losing magnificent opportunities not only to help our patients get well but also to control and develop their characters and personalities as evidenced by their nervous and emotional as well as their intellectual responses. In other words, have we not been affected too much by materialistic and scientific progress and failed too often to appreciate the importance of the individual as a whole, which would include all of these psychic, emo-

tional and ethical values in his life as well as the physical?"

With a continuation of the emphasis in medical schools on psychosomatic relationships, much may be hoped for in an improvement in the relationship between the physician and the patient. Perhaps no better way of emphasizing this point and concluding this discussion can be had than to repeat part of the paragraph attributed to the great "Father of Medicine" with which I opened this discourse, "For some patients, though conscious that their condition is perilous, recover their health simply through their contentment with the goodness of the physician."

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## THE BLOOD IODINE LEVEL, BEFORE AND AFTER SUBTOTAL THYROIDECTOMY FOR HYPERTHYROIDISM\*

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THE history dealing with the relation of iodine to the thyroid gland should be familiar to those interested in goitre problems. From the earliest records which reveal that the Chinese used a concoction made from burnt sponges on their enlarged necks, to the last decade in which iodine has become a medicinal specific in the treatment of hyperthyroidism, certain landmarks may now be viewed as fundamental in our present conception of the association of the iodine metabolism to the structure and function of the thyroid gland.

Following Courtois' discovery of iodine in

seaweed, Comdet in 1820 suggested that this element was related to the function of the thyroid gland. Iodine insufficiency as a goitrogenous factor was noted by Chatin in 1849. As a result of the unfortunate reception of Chatin's work by the French Academy in 1860, the hypothesis that an association existed between iodine and goitre fell into disrepute. Interest was revived in the subject in 1895 when Baumann<sup>1</sup> brilliantly demonstrated the purple vapor of iodine secured from thyroid tissue. From this time, a search was instigated for specific iodine compounds in the thyroid gland. Not until 1916 was the objective attained by Kendall<sup>2</sup> who isolated thyroxine. In 1911 Marine and Lenhart<sup>3</sup> established the relation of hyperplasia of the thyroid gland to clinical hyperthyroidism and advocated the use of iodine in this condition.

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However, the fear of possible unfavorable effects due to the use of iodine was difficult to eradicate. Existing prejudice was overcome by Plummer and Boothby<sup>4</sup> in 1924 and the fact established that iodine medication as a prerequisite to subtotal thyroidectomy for hyperthyroidism is a safe and wise procedure.

With the above developments the necessity for information concerning the presence and amount of iodine in the different tissues of the body became apparent. At the request of the Swiss Goitre Commission, von Fellenberg<sup>5</sup> in 1923 reviewed all the known methods of microchemical analysis of iodine and devised the first adequate method for estimating iodine in amounts such as are present in blood. The thoroughness of von Fellenberg's work is evident when one realizes that most existing methods of blood iodine analysis incorporate all or a part of his original procedure.

Veil and Sturm<sup>6</sup> and Lunde and his co-workers<sup>7</sup> were the first to attempt to correlate the blood iodine level with clinical hyperthyroidism. Cattell<sup>8</sup> reported the effect of the administration of iodine by histologic and chemical analyses of the excised thyroid tissue from hyperthyroid cases. The results of the preceding studies and of many others along related lines have demonstrated that in hyperthyroidism there is a progressive depletion of the iodine content of the thyroid gland concomitant with an increase in the iodine of the blood and urine. In our series of over 100 cases of hyperthyroidism with an elevated blood iodine, urine analysis has shown that these patients may excrete from 0.25 to 1.00 milligram of iodine per day. Since the average diet contains considerably less than 0.25 of a milligram of iodine, it seems likely that a hyperthyroid individual with an elevated blood iodine is in a state of negative iodine balance. This hypothesis has recently been more securely established by Cole and Curtis.<sup>9</sup> It is therefore reasonable to hypothesize that should a hyperthyroid syndrome persist in an individual, the thyroid gland will eventually become depleted of its store of iodine at which time the blood and urinary iodine return to normal. The length of time required to bring about such a response is dependent upon the duration of the disease, together with the size of the thyroid gland at the initiation of the hyperactivity. Correlation of the results of blood iodine analysis previously reported,<sup>10</sup> as well as our more recent studies on the urinary excretion of iodine in cases of hyperthyroidism lends credence to this view.

The purpose of the present study was to determine the influence of subtotal thyroidectomy on the blood iodine level and to ascertain if possible, whether an elevated and a normal blood iodine were each a definite state of iodine metab-

olism in the hyperthyroid individual. Accordingly the blood iodine level was followed postoperatively in 141 cases in which the preoperative level had been determined.\*

Of the 141 cases of hyperthyroidism that have been followed postoperatively, 131 cases were followed for 3 months, 81 cases for 6 months, 46 cases for 9 months and 31 cases for 1 year. Since only 4 of the 83 cases with an elevated preoperative blood iodine did not show a decrease in blood iodine postoperatively and since only 4 of the 58 cases with a normal preoperative blood iodine did not show an increase in blood iodine postoperatively, it was considered permissible to group the cases dependent upon the preoperative blood iodine level. Furthermore it seemed fair to average the blood iodine values of the 2 groups since only the 8 cases cited, of the 141 cases followed, did not show a characteristic blood iodine trend. The results are shown in the following table.

GROUP I Cases of hyperthyroidism with an elevated preoperative blood iodine

	Preop	Number of Cases Followed Postoperatively to			
		3 mos	6 mos	9 mos	1 year
No. of cases	83	76	39	21	14
Average blood iodine in micrograms per cent	260	77	70	76	70

GROUP II Cases of hyperthyroidism with a normal preoperative blood iodine

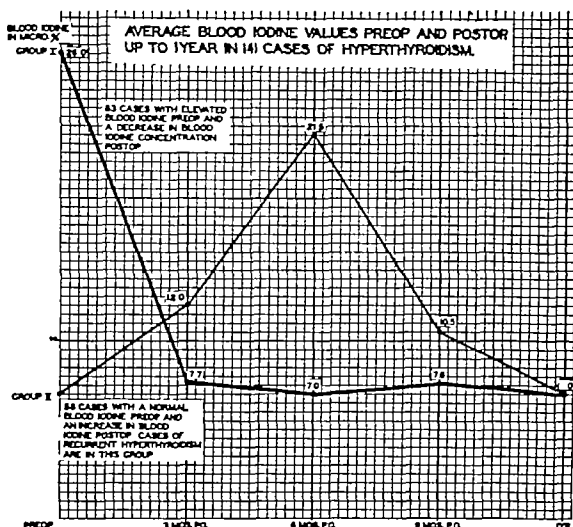
	Preop	Number of Cases Followed Postoperatively to			
		3 mos	6 mos	9 mos	1 year
No. of cases	58	55	42	25	17
Average blood iodine in micrograms per cent	70	120	215	105	70

From the table it will be seen that the average blood iodine level of hyperthyroid individuals with an elevated preoperative blood iodine (Group I) returned to normal 3 months postoperatively and throughout the time followed was found to remain normal. In the hyperthyroid cases with a normal preoperative blood iodine (Group II) the average blood iodine value was increased 3 months postoperatively.

\*The blood sample for iodine analysis was taken the morning following hospitalization. Patients who had received iodine within a two week interval prior to admission were excluded from the present report. Preoperative Lugol's was given for 8 to 15 days and for 1 week postoperatively. When stage operative procedures were found necessary the patients received iodine daily till the completion of the last stage, the interval between operations being 6 weeks. No iodine was given after final discharge from the hospital. At 3, 6, 9 and 12 months postoperatively the patients were hospitalized overnight, the clinical condition checked and a blood sample taken for iodine analysis.



and reached a peak of elevation at 6 months, decreasing at 9 months, and returning to normal at 1 year. The cases followed for 1 year are characteristic of the above blood iodine trends, so it is believed that the cases not followed for the entire time period will eventually show the same blood iodine response. The characteristic trend of the blood iodine level in the two groups is shown graphically in the accompanying chart.



The apparently significant clinical findings in relation to these results were as follows:

In the hyperthyroid cases who had an elevated blood iodine preoperatively (Group I) and a postoperative fall in blood iodine, there was no evidence of recurrent or persistent hyperthyroidism in any case within the time followed.

In the hyperthyroid cases with a normal blood iodine preoperatively (Group II) and a postoperative rise in blood iodine, 4 cases have been diagnosed clinically as having recurrent or persistent hyperthyroidism and 3 cases as borderline recurrence to date—2 cases have increased exophthalmos since operation but the thyroid is apparently negative.

If the blood iodine be considered as an index of the amount of thyroxine in the blood, the results suggest that the iodine hormone, thyroxine, is not the sole factor in hyperthyroidism—a hypothesis based on 2 cases of recurrent hyperthyroidism that were followed untreated and showed at the 9 and 12 month postoperative examination increased signs of recurrent hyperthyroidism in association with a fall in blood iodine to the original normal preoperative level.

The present results suggest that subtotal thyroidectomy in the early stages of hyperthyroidism is inhibitive of recurrence of the syndrome.

Or, when the blood iodine is normal, a more radical subtotal thyroidectomy may reduce the incidence of recurrent hyperthyroidism. However, the possibility should be considered that since the thyroid tissue removed from the latter type of case generally showed a characteristic histopathology<sup>12</sup> (irregular involution and Hürthle cells),<sup>13</sup> regeneration of such tissue left at operation may give rise to an increase in the blood iodine level together with the manifestations of recurrent hyperthyroidism.

In conclusion it may be stated that, on the basis of these results, the blood iodine level is indicative of a state of iodine metabolism and, when influenced by abnormal thyroid function as in hyperthyroidism, is of interpretable value, both before and after subtotal thyroidectomy.

#### SUMMARY

1. Pre- and postoperative blood iodine studies are reported on 141 cases of clinical hyperthyroidism.

2. Hyperthyroid cases with an elevated preoperative blood iodine show a decrease to normal level following subtotal thyroidectomy.

3. Hyperthyroid cases with a normal preoperative blood iodine show an increase in blood iodine following subtotal thyroidectomy, the greatest elevation being at the 6 months postoperative period.

4. Four cases of recurrent hyperthyroidism and 3 cases of borderline recurrence were found to be in the group with a normal preoperative and an elevated postoperative blood iodine.

5. A more radical subtotal thyroidectomy in hyperthyroid cases with a normal blood iodine is suggested as a means of reducing the incidence of recurrent hyperthyroidism.

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## NEW HAMPSHIRE MEDICAL SOCIETY

## ACUTE GASTROINTESTINAL DISEASE IN INFANTS\*

BY RICHARD M SMITH, M.D.†

AS one considers the advances in the saving of life and the improvement of health in this country since the beginning of the twentieth century the reduction of infant mortality must stand among the foremost achievements. In 1915 the general infant mortality rate in the United States registration area was 100 per 1 000 live births. In 1932 it was 58. In 1900 the infant mortality rate for Massachusetts was 157 and in 1934 it was 49. If one analyzes this general rate into the specific causes of death, it is found that the reduction has occurred primarily in deaths due to diseases of the gastrointestinal tract. In 1915 the infant mortality rate in the United States birth registration area for these diseases was 20 or 20 per cent of the total infant deaths. In 1932 it was 5, or 0.88 per cent of the total deaths. In Massachusetts the rate fell per 1000 live births from 45 in 1900 to 27 in 1934. In 1900, deaths from these diseases were very unevenly distributed throughout the year. There was a high peak of deaths during the summer months, especially among artificially fed babies. Those of you who were in practice at that time can well remember the large number of babies who had so-called "summer diarrhea" and the high incidence of fatality. The picture has entirely changed today. The present deaths are distributed fairly evenly throughout the year. The high peak of summer mortality has disappeared. "Summer diarrhea" is no longer prevalent.

It is not possible to explain exactly or to evaluate accurately the relative importance of the factors which are responsible for the change which has occurred. It is clear, however, that three forces have exerted a significant influence upon the situation, a better knowledge of how to feed babies, artificial improvement in the care of babies and the pasteurization of milk.

*Better artificial feeding.* Since the beginning of the century there has been a substantial increase in the body of knowledge concerned with the nutrition of infants. This knowledge has been acquired through painstaking laboratory investigations conducted on animals, and careful clinical and metabolic studies of the actual food intake of normal babies making satisfactory progress in growth and development. We do not know all the facts about infant nutrition and there is need for much further investigation, but our present knowledge is sufficient

for reasonably satisfactory results if one applies intelligently the information which we possess. Our greatest need at the present time is to bring practice up to the present state of knowledge.

We know that there are certain food elements which are essential for the growth and development of infants. We have some conception of the quantitative optimum values of these elements and of the ranges within which variations may occur and not exceed the infant's power of adaptation. We have also learned the importance of vitamins and the significant rôle which they play in infant metabolism and in the prevention of disease. For babies who cannot receive woman's milk, the food requirements except for total calories and vitamins can be met by cow's milk given in amounts determined in relation to the age, weight, and other individual characteristics of the infant. After six months of age additional iron in some form will also be needed. It has been demonstrated clearly that the vast majority of normal infants will progress satisfactorily on simple whole milk dilutions with the addition of sugar and the necessary vitamins. Evaporated milk may be substituted when a proper liquid milk is not easily available. The kind of sugar which is used is not of great importance and the choice depends more upon the preference and experience of the physician than upon the superiority of one variety over another. Vitamin C found in orange juice, tomato juice and other fresh fruits must be given to supplement the limited amount contained in milk. Vitamin D must also be supplied by cod liver oil or some equally potent substance to insure against the development of rickets.

The market is flooded with many ready-made patented and proprietary baby foods. The use of these foods has become widespread especially in the last ten years. I am inclined to believe that this practice has retarded and not aided the intelligent artificial feeding of infants. In order to provide an infant with the essential food elements in adequate amounts and in proper relation one to the other it is necessary to understand the fundamental principles of infant nutrition. The principles may be easily understood with a moderate amount of study. Once these are mastered, the adaptation of the principles to the needs of the individual baby is not a difficult problem. The use of proprietary foods is a rule of thumb procedure and presupposes no knowledge of the fundamentals upon the part of the practitioner. Lack of success with one food is often met by trial of another and sometimes of another and another. It is all too common to find a baby who has

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been changed back and forth without at any time having received an adequate food. We shall all of us have much better success in infant feeding, and the babies under our care will make better progress, if we learn the fundamental principles and acquire experience in the use of simple whole milk dilutions.

*Better care.* Not only do we know more than formerly about the nutritive requirements of infants, but babies receive better care today than they did thirty-five years ago. In this respect practice has approached more nearly and more widely to the application of knowledge. This has been brought about through the education of mothers and others who care for babies. Infant welfare stations, public health nurses, and many lay organizations have contributed to the educational program. As physicians we are responsible for the content of the instruction which is given by lay persons, and for the actual instruction of our own patients. We are fortunate that so many agencies in the community are fostering this work. We must continue to furnish leadership, the maintenance of high standards, and the introduction of new knowledge as it may become available.

*Pasteurized milk.* It is interesting to compare the falling infant mortality rate especially in gastrointestinal diseases, with the extension in the pasteurization of milk. The two lines run very nearly parallel. The pasteurization of milk is not only effective against specific diseases, such as tuberculosis, scarlet fever, and septic sore throat, but has undoubtedly had a direct influence in the reduction of the gastrointestinal diseases of infancy. There is no evidence to indicate that the pasteurization of milk causes any decrease in its nutritive value. As physicians we must be insistent in our attitude that no baby shall be fed raw milk.

If we turn now from a consideration of mortality to a discussion of morbidity, we shall find that despite the reduction in the number of deaths, the gastrointestinal diseases or symptoms referable to the gastrointestinal tract still occupy an important place in medical practice among infants. In infants, disease is recognized by the appearance of some objective sign. In an analysis made by J. A. Johnson of 3000 consecutive admissions to the Infants' Hospital in Boston, it was found that 75 per cent of the babies were brought to the hospital because of one of three reasons, loss of weight or failure to gain, vomiting, or diarrhea. When an infant presents any one or any combination of these complaints, how should one proceed in order to determine the cause of the symptoms and to institute proper treatment?

First of all, one should secure an accurate history. It is to be remembered that in securing a history from an infant one is dependent entirely upon information obtained through a

third person. The infant can give no account of his own symptoms. One must rely upon the objective signs which he presents, such as crying or irritability, or some other departure from normal behavior. The mother or the nurse may be an accurate observer, but the chances are that the unprompted history will be tinged with the point of view of the person who gives it. The fact that the mother is worried and anxious about her sick child tends to make her distort the facts and to overemphasize some unimportant details at the expense of essential data. It takes time, patience, and some experience to arrive at an orderly statement, but it is time well spent and no actual detail in the history is too trivial to bear consideration.

It is equally important after securing as reliable a history as possible, to make a careful and complete physical examination. Here again, as in history taking, the technique is somewhat different from the procedure in dealing with adults. It is very difficult to make a satisfactory examination of an infant who is frightened and rebellious. Therefore, a certain amount of time must be spent in gaining the confidence of the baby, and it is important to conduct as much of the examination as is possible before the baby is disturbed. It is remarkable how much information may be acquired from simple inspection. The next stage of the examination should be undertaken by doing first the things which are least likely to cause an unfavorable reaction. Babies always resent quick sudden movements. They object to cold hands. It is desirable to use a stethoscope early before crying begins, and to postpone, until the last, looking at the throat and a rectal examination.

With an accurate history, a careful physical examination, and whatever additional laboratory data are necessary, one is in a position to consider a diagnosis. Again referring to the experience at the Infants' Hospital one may divide into four groups the conditions which are most likely to cause the presenting symptoms of either vomiting, diarrhea, or loss in weight, or any combination of these. There will be a few infants who present other conditions, such as intussusception, but in the great majority the diagnosis will be found to be in one of these groups.

- 1 Infection
- 2 Congenital anomalies
- 3 Faulty environmental or hygienic conditions
- 4 Improper food

Any one infant may fall into more than one of these groups at the same time, but the relative frequency and importance of the causes of the symptoms of vomiting and diarrhea or loss of weight are in the order given.

*Infection* Infection in infants may give rise to gastrointestinal symptoms not only when the infection is in the gastrointestinal tract, enteric infection but may also when the infection is in some part of the body, parenteral infection. In any child who has an acute gastrointestinal disturbance one must search thoroughly and repeatedly for evidences of infection. It is important to point out that infection in infants frequently is manifest by quite different physical signs from those in adults. The temperature may be normal or even subnormal in the presence of severe infection. The white blood count, however, is usually elevated but may be normal with a relative increase in the polymorphonuclear leucocytes. When there is disease of the respiratory tract, which is one of the most frequent types of infection, the only signs evident on physical examination may be an abnormal reddening of the ear drums. The physical signs of pneumonia early in the disease may consist only of a suppression of breath sounds over the affected lobe or may show no abnormal physical signs in the chest. The roentgen-ray is of great assistance in diagnosis at this stage of pulmonary involvement. The reflexes in infants are relatively unreliable and even in meningitis there may be no rigidity of the neck and an absent Kernig's sign.

The definite signs of gastrointestinal tract infection, mucus, pus and blood in the stools may not make their appearance until the disease has been present for several days. In the milder types of dysentery there may be no bleeding. Positive agglutination reactions in the blood will however indicate the specific character of the infection. One is not so likely to miss this form of infection as to attribute to disease in the gastrointestinal tract an infection elsewhere in the body with gastrointestinal symptoms.

*Congenital anomalies* A congenital anomaly is missed in diagnosis in most instances not because a diagnosis cannot be made but because of failure to consider this possibility and to look for it. As in infection because the presenting symptoms are of the gastrointestinal tract it does not necessarily follow that the congenital anomaly which causes the symptoms is in the gastrointestinal tract. For instance an anomaly of the urinary tract which is not at all rare in infants may give no signs of urinary symptoms but may be the basis of persistent vomiting and diarrhea. Particularly is this true if there is a superimposed or concurrent infection. Examination of the urine of a sick infant should be considered a routine part of the physical examination. Congenital heart disease may explain failure to gain, or loss in weight, even though there are no signs of cardiac decompensation. Congenital lesions of the gastrointestinal tract itself are not rare and should always be considered

in the diagnosis of any sick infant, especially when vomiting is an important symptom. The earlier in life symptoms of disease appear, the greater the chance that some congenital anomaly is present, but the late appearance of symptoms by no means excludes an anomaly. An intermittent occurrence of symptoms is also consistent with a mechanical explanation on the basis of an anomaly in development. The methods by which an anomaly may be proved to exist vary with the type of lesion, but in every instance require careful examination and often the use of supplementary special and laboratory procedures, especially the roentgen ray.

*Faulty environmental or hygienic conditions* High temperature, especially when associated with high humidity, is universally recognized as having an unfavorable effect upon infants but, further than that, this group of causes is often given little consideration. Unlike infection and congenital anomalies, for which a careful physical examination is of such great importance, in these conditions the facts are obtained only through a careful history. History taking is time-consuming and, in order to secure the necessary information, must be meticulous in detail. We must know how the food is prepared, how it is given, the hours of sleep and daily routine, and many other fine points of the infant's care. Many babies are sick because of poor care and many can be cured by the institution of proper hygiene. It is a common occurrence for all symptoms of disease to disappear when an infant is admitted to a hospital and placed upon a good routine. A good infant's nurse may often accomplish the same results even though the infant remains at home.

*Improper food* When an infant has a disturbance of the gastrointestinal tract one might suppose that the most probable explanation would be found in improper food yet we know from experience that this is the least likely cause for the symptoms. We are driven to conclude that an infant has a wide tolerance in digestive and assimilative capacity and can adapt himself to a variety of food combinations provided only its fundamental requirements are satisfied. From a practical point of view for us as physicians it is important to remember that other causes for digestive symptoms in infants are to be sought beyond the food intake. It is not enough to change the formula or to try some other or new proprietary baby food. We will rarely cure vomiting or diarrhea that way. One should, of course, know what food a baby has been taking and if it is grossly faulty the proper food should be substituted, but the cause of the acute illness, even though the symptoms are primarily or entirely confined to the gastrointestinal tract, will usually be found to be other than improper food. This is not to be interpreted to mean that faulty feeding is never a

cause of disease in infants, because of course such an impression is contrary to the facts. Lack of vitamin C in the diet may cause scurvy, or a deficiency of iron may result in serious anemia, but improper food is less often the cause of disease than is commonly believed, and of less importance in explaining gastrointestinal symptoms in infants than either infection, congenital anomalies, or improper environment and hygiene.

**Diagnosis** When an infant is taken sick with vomiting or diarrhea or both, or fails to make satisfactory progress in weight, we may reasonably expect to find one of four things, or some combination of these four things, to be the cause. In the order of frequency these things are the following:

- 1 Infection somewhere in the body, not necessarily or most likely in the gastrointestinal tract
- 2 A congenital anomaly again not necessarily in the gastrointestinal tract
- 3 Faulty environment or hygiene
- 4 Improper food

A careful history and a complete physical examination are necessary to determine which of these four things is responsible for the symptoms in the particular baby. If one takes enough time for the history and is sufficiently thorough in the physical examination, a diagnosis can be made in most instances.

**Treatment** The treatment will vary according to the diagnosis. When infection is present the treatment may be specific or nonspecific according to the findings. Of the nonspecific measures the maintenance of body fluids at, or their restoration to, normal levels, if there has been severe loss, constitutes one of the major procedures essential to the saving of life. Studies indicating the specific change in blood chemistry brought about by vomiting and diarrhea have furnished the basis for effective therapy. Real advance has been made during the last few years in this matter. We have come to realize, also, that starvation for long periods of time is a deterrent, not a help, to recovery.

The treatment for a congenital anomaly is usually surgical. Some anomalies have thus far not been successfully dealt with, but the number is constantly growing less. The techniques of the operative procedures require special familiarity with this field and skill in the handling of small and delicate tissues.

The correction of faulty environmental and hygienic conditions requires education of the family. Frequently the environment cannot be altered but much can be done to mitigate its deleterious influence. Poor hygiene can be changed but it is often a long and tedious process and requires patience and consideration.

For the treatment of an infant who has been

receiving improper food, one needs to know the food requirements of the particular baby and how to provide a formula which will meet them. As has been said earlier, whole milk dilutions with added sugar and vitamins will supply everything which is needed in practically every instance. One has only to learn how to use these simple tools to be able to prescribe the proper food for a normal baby. It is rarely, if ever, necessary to employ ready-made foods, the composition of which is imperfectly understood.

In conclusion, I should like to emphasize again the importance of an accurate history and the necessity for a complete careful physical examination as the basis for an accurate diagnosis. Vomiting, diarrhea, and loss of weight alone, or in combination, are the commonest symptoms of disease in infants. In the order of importance, infection, congenital anomalies, faulty hygiene, and improper food are the causes of these symptoms. Treatment to be effective must be directed toward a removal of the cause.

#### DISCUSSION

CHAIRMAN KITTREDGE Discussion of this paper will be opened by Dr. Ursula G. Sanders of Concord, New Hampshire.

DR. URSULA G. SANDERS Dr. Smith has stressed the progress that has been made in lowering the number of cases of diseases of the gastrointestinal tract in infancy. Here at the present time there is surprisingly little "summer diarrhea." For the city of Concord, mortality figures for diarrhea and enteritis in children under two years give the following comparison: 1891, 28 deaths, 1910, 13, 1921, 4, 1931, 1. Statistics for the entire state of New Hampshire show a recent reduction in deaths from this cause: 1932, 32; 1933, 18; 1934, 16.

These results seem to have been accomplished largely by Public Health measures, the improvement of milk having been a major factor. In New Hampshire, milk inspection began in 1903, delegated to the town health officials. This greatly increased in scope until, in 1931, State regulations were adopted governing the process from production to distribution. General education in the better care of infants has been an important factor. In this respect, with the new programs for child welfare, one anticipates steady progress.

The importance of differentiating the causes of gastrointestinal disturbances has been emphasized by Dr. Smith. On a pediatrics service, one is familiar with the infant who has been put through a variety of formulas, when a cause for gastrointestinal symptoms other than faulty intake is later found responsible.

I wonder if allergic phenomena might not be included in listing the various conditions giving rise to gastrointestinal symptoms. In allergic reactions the changes in the capillary mechanism may result in congestion, exudation, and hemorrhage producing symptoms such as nausea, vomiting, abdominal colic, and diarrhea. An interesting case which might be classified in this allergic group was seen recently. Ten days following vaccination for smallpox in a child marked the onset of allergic manifestations (Henoch-Schönlein) with severe, typical gastrointestinal disturbance.

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SURGICAL DISEASES OF THE ALIMENTARY TRACT  
IN INFANTS\*

BY WILLIAM E LADD M D †

IT may not be out of place in a meeting of this sort, which is concentrating on pediatric problems to refer to the development of pediatrics as a specialty. You will recall that the problem of infant feeding was one of the principal factors in bringing pediatrics into prominence as a specialty and like many other movements in medicine and surgery, its importance was given undue emphasis in the beginning. This statement is made with no wish to belittle the advances which have been made in infant feeding but rather to call your attention to the fact that all disorders of the alimentary tract are not due to improper feeding, and by that same token to assure you that they cannot all be remedied by changing the character of the formula. It cannot be too often reiterated that the first step in the successful treatment of any given case is the making of a correct diagnosis. To accomplish this in infancy is often more difficult than in adolescence or adult life. The history-taking is obviously more difficult, as it must be taken from a third person, and the physical examination usually is hampered by fussing or lack of co-operation of the patient. X-ray examination and other laboratory findings should be used to supplement but not supplant the history and physical examination. The physical examination of an infant should be complete, but the order of procedure is more important than in the adult. Any part of the examination which is painful must be postponed until the end. Many an abdominal examination is made valueless by first gagging an infant with a throat stick. Everything that it is possible to learn by inspection should be first noted. In making the abdominal examination, distention, engorgement of the abdominal veins, visible peristalsis, or tumor should be looked for before the infant is touched. Gentle palpation must precede deep palpation. Percussion and auscultation should be included and finally to be complete a rectal examination should be made. Pathologic conditions of infancy which attract one's attention to the alimentary tract by vomiting or other manifestation and which require surgical aid are really more common than those which require regulation of feeding. It is my purpose to discuss some of these surgical diseases.

Congenital hypertrophic pyloric stenosis is one of the commonest. In our series of 620 cases, this condition was found to occur more commonly in the male in the proportion of 85 per cent male to 15 per cent female infants. The symptoms usually start in the third week of life, though in 10 per cent of the patients they started in the first week. Vomiting, projectile in character, and with the vomitus containing ingested food and gastric secretions only, is the first and most prominent symptom. It is important to remember that if the vomitus contains bile one is not dealing with pyloric stenosis. The stools become scanty. The infant loses weight and becomes dehydrated. On physical examination, peristaltic waves may be seen in the epigastrium running from left to right. On palpation, an olive shaped and sized tumor may be felt in the right upper quadrant near the mid line just under the liver, or sometimes as low as the umbilicus. Success in palpating the tumor is increased by experience and by obtaining relaxation of the abdominal muscles. The simplest method of obtaining the desired relaxation is by feeding the infant and making the examination during the feeding or just after vomiting has occurred. If one finds these five cardinal signs and symptoms namely projectile vomiting, scanty stools, loss of weight and dehydration, visible gastric peristalsis, and the characteristic palpable tumor, the diagnosis of pyloric stenosis is almost certain and the supplementary use of an x-ray examination is neither necessary nor desirable.

The treatment is surgical, and includes careful preoperative care and postoperative feeding. Failure to include these two important parts of the surgical treatment is the cause of the still high mortality in the large general hospitals, or in the hands of surgeons unfamiliar with infants. The preoperative care consists in overcoming dehydration and ketosis and maintaining normal body temperature. The operation of choice is a pyloromyotomy. It is a simple operation but its simplicity apparently is misleading and is the cause of too frequent errors of technique. The commonest errors are, first, failure to cut all the circular muscle fibres of the pyloric sphincter in which case the symptoms persist, secondly, perforating the mucous membrane at the duodenal end of the pylorus which it unrecognized leads to peritonitis and a fatal termination, thirdly, failure to close the abdominal wound carefully in layers with silk

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sutures Fatalities following evisceration in these emaciated infants have been too frequent and may be largely avoided by a suitable closure of the abdominal wound. The postoperative care of these infants is important. Administration of parenteral fluids is continued if the state of dehydration calls for it. Feeding is begun almost as soon as the patient is out of the anesthetic. Whey is given in small amounts for the first twenty-four hours, then whey and breast milk, and by the end of the second day straight breast milk in small amounts which is gradually increased up to the caloric requirement of the infant. These patients do better in their postoperative period with small feedings at more frequent intervals. It is unwise to try to get them onto a four-hour interval between feedings for at least two weeks after operation.

The surgical treatment of pyloric stenosis is among the most satisfactory procedures in the surgical field. We have cared for 620 cases at the Children's Hospital in the last twenty years. In the first 125 cases, 13 deaths occurred, a mortality of approximately 10 per cent, while in the next 495 cases the mortality dropped to 4 per cent, and in this latter group 160 patients were operated on consecutively without a fatality. The results in private practice have been a little better than those obtained in the charity wards, for the reason that as a rule such patients seek surgical relief earlier while they are in better general condition.

Before dropping the question of pyloric stenosis, a word should be said about pylorospasm. This condition is unquestionably a real one and sometimes difficult to differentiate from pyloric stenosis. The general hypertonicity of the infant, the irregularity of the symptoms and the failure to demonstrate a tumor are the most important points of differentiation.

When vomiting takes place in the first few days of life and the vomitus contains bile, one should think at once of some form of arrested development of the alimentary tract, causing obstruction below the ampulla of Vater. These conditions are far more common than is usually supposed. We have divided these cases of congenital obstruction into two main groups, the group of intrinsic obstruction and that of extrinsic obstruction. Many embryologic events take place between the fifth and tenth weeks of fetal life. At about the fifth week of fetal life the intestinal lumen becomes obliterated by epithelial concrescence to become reestablished again by the tenth or twelfth week. The cases of intestinal obstruction which have been classified as intrinsic are those which are dependent on arrest in development of the intestine during its progression from the solid to the tubular stage. This arrest in development results in

the formation of a blind end, causing complete obstruction, or in a velum remaining across the lumen with a small opening in it causing a partial obstruction. Such congenital atresias or stenoses may take place in any part of the intestine or may be multiple. In a series of fifty-three cases at the Children's Hospital, not including the obstruction of the sigmoid or rectum, the obstruction occurred nine times in the duodenum, seven times in the jejunum, and 31 times in the ileum, and in six cases the obstruction was either multiple or involved the colon. The diagnosis is made by the usual symptoms and signs of intestinal obstruction, namely, pain, vomiting, lack of stools, abdominal distention, visible peristalsis or intestinal patterning, shock, and dehydration. Exceptions to the rules are found in the atresias of the duodenum in which the vomiting may be sufficiently effective so that there is no distention. Laboratory data which may be helpful in confirming the diagnosis, are failure to find keratinized epithelial cells in the rectal discharge, and an x ray of the abdomen without the ingestion of contrast media. This latter procedure will often demonstrate very accurately the site of the lesion by the position of the air in the intestine above the obstruction and the lack of it below.

The mortality in these conditions is extremely high, but the percentage of recoveries is increasing. In this series of fifty-three patients, ten have survived. Five of the nine patients in whom the obstruction was in the duodenum have recovered, two of the seven patients in whom it was in the jejunum, and three of the thirty-one who had obstruction in the ileum have recovered. Of the ten recoveries, nine resulted from a primary anastomosis by a special technic, and only one as a result of an enterostomy with a secondary anastomosis. This is important to remember as it is usually the surgeon's tendency, when confronted with a case of atresia and the collapsed minute bowel below, to think that an enterostomy instead of a primary anastomosis is the operation of choice. In reality the exact opposite has been proved to be the correct procedure. It is also desirable to know that in the cases of atresia the bowel is likely to perforate a few inches behind the blind end by the end of the fifth or sixth day. The chance of recovery is much greater if the operation is performed prior to this time, preferably by the third or at the latest, the fourth day.

The cases classified here as extrinsic obstructions are those dependent on a faulty rotation of the midgut. They all have in common the lack of the normal oblique attachment of the mesentery of the small intestine and the normal attachment of the mesentery of the ascending colon. There is quite a variety in the abnormalities found and they are apt to be extremely



confusing unless the normal embryologic development is borne in mind. As the postarterial segment of the midgut returns from the base of the umbilical cord to the abdominal cavity, going first to the left side and rotating to the right in front of the duodenum, the cecum may become attached to the posterior abdominal wall so as to constrict the duodenum where it crosses it. This of course gives the signs and symptoms of high intestinal obstruction. The whole midgut may remain unattached to the posterior abdominal wall except at the point of origin of the superior mesenteric artery. In this instance, a volvulus of the midgut is likely to take place, giving the symptoms of acute intestinal obstruction. The volvulus usually twists in a clockwise direction, though occasionally it goes in the reverse direction. In either event the pressure comes on the third part of the duodenum first, so that in the early stages of the obstruction there is not very marked general distention. The diagnosis of these conditions is made by the usual signs and symptoms of intestinal obstruction. An x-ray examination without the administration of barium may differentiate the extrinsic and intrinsic intestinal obstruction, or if the symptoms have not come on immediately after birth, a barium enema and x-ray examination may make the diagnosis definite.

The treatment of these conditions by the principles which have been devised and adopted at the Boston Children's Hospital has a high percentage of success. Prior to the adoption of the present type of operation these cases were 100 per cent fatal, in our clinic at least, and in reviewing 349 articles in the literature fairly recently only fifteen operative recoveries were noted. In the cases in which the obstruction was due to the cecum colon or superior mesenteric artery impinging on the duodenum, it was found that this could be relieved by transferring the cecum with its mesentery to the left upper quadrant and exposing the duodenum anteriorly throughout its whole length. This is accomplished by making an incision in the posterior parietal peritoneum just to the right of the duodenum and pushing the cecum and colon with its blood supply to the left, in other words, restoring an earlier state of embryologic development. In the cases of midgut volvulus, the whole midgut (i.e., the intestine from the duodenum to the middle of the transverse colon) must be delivered out of the abdominal incision to find out in which direction the volvulus has taken place. The volvulus is then reduced and the procedure described above carried out. It has been found inadequate to reduce the volvulus only. This has been invariably followed by recurrence or a fatal termination or both. There have been twenty-nine of

these cases of intestinal obstruction due to mal- or nonrotation of the bowel. In twenty-one of them the type of operation I have described has been done. Of these twenty-one patients sixteen have recovered. In the other eight patients various other types of operations have been performed with a fatal result in every instance.

As the infant gets beyond the first few days or weeks of life he becomes subject to pathologic conditions not the result of congenital malformation. Intussusception is certainly one of the most important of these to bear in mind as the mortality is so greatly affected by the time at which the diagnosis is made. There should be no mortality from this condition if the diagnosis is made early enough and a capable surgeon is at hand. The peak of incidence is in the seventh month of life. The disease occurs most commonly in well nourished, healthy looking babies, which is presumably one reason for the diagnosis being so frequently missed at the physician's first visit when it is so important that it should be made. The onset is sudden, characterized by crying, evidence of abdominal pain, pallor, nausea, and vomiting. The pain is severe only when peristalsis is active and between times the healthy appearing infant may be entirely contented, which is an added reason for missing the diagnosis. A normal stool may be passed in the first hours of the disease but by the end of twelve hours, blood usually appears in the rectum. The right side of the abdomen is the most common place to find the mass in the early stages of the disease, as the ileocecal region is the most common situation for the invagination to originate. A short time later the intussusception may have advanced to the hepatic flexure where it is difficult to palpate. As it advances again to the transverse or descending colon it is easily recognized until general intestinal distention becomes so marked as to obscure it. At this stage it may be readily felt by rectal examination, the advancing point feeling much like the adult cervix uteri.

The treatment is surgical. From time to time articles appear in the literature readvocating the treatment of injection of fluids into the colon to cause the reduction of the intussusception. Some of these papers show good results, but it should be noted that the good results are obtained only in that group of cases in which we have no mortality by operative treatment, namely, the cases which come to operation in the first twenty-four hours of the disease. Seventy-nine such patients have been operated on since 1928 without mortality. The injection method is uncertain even when performed under the fluoroscope. If unsuccessful, the injection necessarily adds to the shock, wastes time and increases the mortality in the patients in whom the margin of safety is small. In this series of

431 cases, thirty-two patients were operated on in the period from 1908 to 1912, eighteen of whom died, showing a mortality of 59 per cent. From 1912 to 1928 the statistics have consistently improved and in the period from 1928 to 1936, 149 patients were operated on, of whom twenty-one died, a mortality of 14 per cent. This drop in mortality from 59 per cent to 14 per cent is undoubtedly due in large measure to receiving the patients earlier, but partly due to better preoperative, operative, and post-operative care. When once the diagnosis has been made, the operation is performed without delay, but during the time the operating room is being prepared, parenteral fluids are given. In the operation as much of the reduction as possible is done intra-abdominally. In the last part of the reduction which is always the most difficult, much more patience is used than formerly, even to the extent of splitting the muscular coats of the receiving ring, in order to complete the reduction before resorting to resection. This means that fewer resections are done now than formerly. If the intestine is gangrenous, of course resection must be performed. There have been thirty-three resections done with five recoveries. When resection is necessary it is best performed in two stages, the resection and double barreled enterostomy as the first stage, and the closure as the second stage. A high temperature and other evidences of severe toxemia usually follow the reduction of intussusception. The administration of glucose intravenously and saline by clysis appear to be the most successful means at our disposal for combating this toxemia. In this group of 431 cases there have been eight recurrences. One of the eight was a patient who had been operated on at another hospital and in whom the ileum had been stitched to the colon in hope of preventing recurrence. We do not advocate doing any of the operations that have been recommended for preventing recurrences for three reasons. First, their efficacy is questionable, secondly, they add to the danger of the operation, and thirdly, we have so far had no mortality in this group of recurrent cases. Fatalities in intussusception are preventable by early diagnosis and appropriate treatment.

This paper of course covers but a small fragment of the surgical abdominal conditions which occur in the first year of life. It is obvious that they could not all be included. These few were selected as being among the more important and demonstrating some of the principles of surgery in infancy.

## DISCUSSION

PRESIDENT ABBOTT Discussion of Dr Ladd's paper will be opened by Dr MacLean J Gill of Concord.

DR. MACLEAN J GILL I just want to say that from the pediatrician's standpoint, I certainly agree that pyloric stenosis is a surgical problem and should never be treated medically, once the diagnosis has been made. The diagnosis is made when you have palpated the tumor. That is going to take a lot of time and a lot of patience on the part of the examiner. It may take more than one examination even two or three, before you are able to feel the tumor. If a tumor is not palpable the chances are the child is not suffering from pyloric stenosis.

You have already been told that a lot of different diseases will cause vomiting and diarrhea in children, and may give the symptoms and signs of an acute abdomen. If we would only stop to consider the season of the year it happens to be it would often help us to arrive at a correct diagnosis. We all know that dysentery and typhoid fever are most common in the summer months. Quite often, children will have vomiting and diarrhea and may have signs of an acute abdomen with dysentery and typhoid infection.

We can rule these infections out by doing bacteriologic studies.

Again, the so called devil's gripe is most common during the summer months namely July and August and this disease certainly does give signs and symptoms of an acute abdomen with vomiting and there may be diarrhea.

The best way that I know to rule this disease out is by doing a white blood count. We usually find a leukopenia or a normal white count with an elevation of temperature and a relative lymphocytosis.

Then in children we must also remember that there is such a thing as "green apple" colic. Children can be very sick and have a lot of abdominal pain and diarrhea because of eating green apples and during the season when we have green apples we often see a lot of sickness due to green apple colic.

Again in the fall or in the late summer we have to consider the possibility of infantile paralysis and quite often, the first symptoms are vomiting, abdominal pain and rigidity of the spine. If we are immediately aware that we are in the season when we see cases of infantile paralysis and if there are other cases in the neighborhood it may help us to arrive at a diagnosis.

Last of all although not a seasonal incident, I think we should not forget the incident of lead poisoning in children which causes vomiting and diarrhea and often some abdominal pain. We most certainly should not forget that there is such a condition as acute lead poisoning in infants and children.

PRESIDENT ABBOTT The meeting is now open for discussion and questions.

DR. SMITH One question was asked with reference to allergy. I think one condition that is responsible for symptoms in infants and children even though perhaps it is less common than other possible causes, is improper food or food disturbances.

The real point which I should like to leave with you if I may is that with children or infants who have vomiting and diarrhea we should not be content with changing the formulas, but should attempt to find the reasons for the symptoms. Very often we would find these reasons in the four groups that I mentioned previously.

## DIURETICS AND WHAT THEY DO\*

BY HENRY A. CHRISTIAN, M.D.

IF diuretics are given to patients with severe acute nephritis, in all probability they will do harm. This judgment is not based on clinical experience, since, for reasons which I shall speak about later, I have never used them in such patients, but it is based on animal experimentation carried out twenty-three years ago by myself and my associates, Drs Dawson O'Hare and Walker in which it was found that with a severe experimental nephritis diuretics such as diuretin, theocin, caffeine potassium acetate and even water, shortened the lives of the experimental animals, indicating that a diuretic threw an increased burden on the kidney already seriously damaged. Mercurial diuretics were not used in these experiments, modern mercurial diuretics were not at that time in use.

No satisfactory evidence has ever been adduced that diuretics accomplish much more than free the body from accumulated water with its solutes, that is, from oedema, the constituents of which in themselves are not toxic. In severe acute nephritis oedema practically never is a significant cause of discomfort to the patient and so needs no therapy. In patients with acute nephritis with toxic symptoms and a very low urine output diuretics seem to be of little help and as they may, judged from animal experiment, do harm, it seems wise not to use them in the treatment of such patients. In chronic nephritis with nitrogen retention and toxic manifestations so called uremia, clinical experience is that diuretics do not help, and that sometimes here they seem to do injury.

In other words, what we seek to accomplish by diuretics is to remove from the body accumulated fluid that is doing harm by its presence. Moderate oedema for example of the ankles, is not an indication for the use of diuretics. I do not regard diuretics here as desirable for cosmetic effects. Some of the lady patients might like to have diuretics under those circumstances, but to give them probably is not good practice.

There is a very curious incompatibility between nitrogen retention and the retention of water in the form of oedema, so much so that one can be pretty safe in saying that the patient, who is toxic in this sense, will not be oedematous, unless he has circulatory failure. This point is of practical value to the practitioner who does not have access to a laboratory

to determine the blood nitrogen level of his patients.

Symptoms from oedema vary very greatly, depending upon where the fluid is accumulating. Oedema of the brain may be fatal. Hydrothorax may interfere seriously with circulation and respiration. Ascites, unless excessive, is only uncomfortable. Subcutaneous oedema, unless marked, causes few symptoms.

Furthermore, oedema in different locations in the body responds differently to diuretics and particularly with regard to the speed of the disappearance of the oedema. If the oedema is causing serious symptoms, and if drug therapy will remove the oedema but slowly, one should not depend upon diuretics, but should remove the fluid mechanically to relieve the pressure. Again, obviously, it would be foolish to treat severe cerebral oedema by diuretics, because your patient would probably be dead before the diuretic drugs could get started in action, and, of course, death would end their action.

Hydrothorax, which we see so often in people with oedema, responds slowly to diuretic drugs, and on the whole not very satisfactorily. The needle is wiser than the pill under those circumstances. I believe that hydrothorax in an oedematous patient, particularly one with circulatory difficulty, should be relieved by tapping before you leave the patient on your first visit.

Subcutaneous oedema and ascites are the profitable fields for the use of diuretic drugs. We have available a number of diuretic drugs. In fact, we have available many more than there is any necessity of the practitioner using. The doctor should use only the few with which he is familiar, and it is injudicious for him to use those whose action he does not thoroughly understand.

A good many forms of oedema do not require any diuretic drugs, because treatment of the underlying condition will clear up the oedema without the necessity of using a diuretic drug. For example, every now and then we see a patient with pernicious anemia with a marked degree of oedema. Liver therapy here will take care of the anemia in a relatively short time, and the oedema will fade away without using any diuretic drugs.

Sometimes we see ascites and hydrothorax with pericardial fluid in patients with myxoedema. In such cases thyroid gland substance will clear up the myxoedema symptoms and will also cause elimination of the fluid, and as a rule, no diuretic drug is needed when the oedema is part of a myxoedema. We have certain local

An address at the Annual Meeting of the New Hampshire Medical Society at Manchester May 26 1936

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oedemas which depend upon obstruction of the veins or of the lymphatics or upon local inflammatory conditions. These require treatment other than diuretic drugs and are more surgical than medical in their therapeutic aspects.

The forms of oedema, in which diuretic drugs play their chief rôle of effectiveness, are the forms of oedema that we call renal oedema, the so-called nephrosis syndrome, and circulatory oedema, either cardiac or hepatic. In the former, the oedema mainly is the result of disturbed osmotic relationships between blood plasma and body fluids, in the latter, the oedema results mainly from disturbances in the hydrostatic pressure relationships between circulating blood and extra-capillary pressures. No oedema, however, is so simple as to be reducible to single causative factors, and this plays an influencing part in both mechanism and management.

To remove oedema, we can proceed along two lines. We can do something to change the underlying causative factor, or we can do something to increase the excretion of the retained fluid. For example, in renal oedema, the so-called nephrosis syndrome, we can raise the osmotic tension by an injection of an acacia solution and that will bring about a diuresis. In just the same form of oedema instead of changing the osmotic tension we can increase the output of fluid by using a mercurial diuretic. By direct action on the kidney, this will increase the urine output by decreasing tubular reabsorption.

In cardiac oedema we can combat the cause of oedema by improving the circulation by the use of digitalis. Digitalis, in that sense, is a diuretic. In renal oedema digitalis will have no effect on the fluid, it is in no sense a diuretic for these patients. In the patient with cardiac oedema, in addition to improving the circulation (and we can improve the circulation both generally and in the kidney itself by using digitalis), we can use a diuretic such as some one of the xanthine group, as diuretin or theocin or some of the combinations of those drugs. We need to remember that some diuretics, such as those of the xanthine group, are effective when given by mouth, while others, such as the mercurials, are ineffective when given by mouth. Obviously, the difference in administration is a determining factor in the selection of the diuretic drug for a given case. By and large it is wiser to use drugs effective by mouth dosage, although sometimes it is more profitable to use drugs that work only after parenteral dosage.

In renal oedema, the so-called nephrosis syndrome, we find that the xanthine diuretics, like theocin and diuretin, are very ineffective, and it is hardly worth while to try them out in this type of patient. On the other hand, the mer-

curial diuretics are very markedly effective in dealing with the oedema of nephrosis. In modern times we have been slow to use the mercurial diuretics in the patient who had renal disease, because we were fearful that the toxicity of mercury to the kidney would cause increased renal damage. Gradually we have learned that these mercurial diuretics are safe to use in the type of renal disease which expresses itself clinically by the production of oedema.

We have available three mercurial diuretics that are very satisfactory. They are novasurol, salyrgan and mercupurin. Their mercury content increases in the order in which I have named them, and their toxicity decreases in the inverse order to their content in mercury. Mercupurin seems to me, of the group, preferable, but salyrgan is nearly as satisfactory. Both are definitely preferable to novasurol, both in effectiveness and in lessened toxicity.

All of the mercurials must be given parenterally, preferably intravenously, but they may be used intramuscularly, provided the drug is injected deep into the muscle tissues. Novasurol is more irritating than mercupurin or salyrgan, on the whole mercupurin is the least irritating in the muscles. The mercury constituent of mercupurin can be used also in the form of a suppository and thus given is very effective as a diuretic drug. (Since this address was given, it has been found that salyrgan, too, can be prepared so as to be effective in the form of a suppository.) It is not irritating to any appreciable extent to the rectum. It enables the physician to send his patient home with a stock of suppositories with directions how to use them, thus obviating the necessity of the physician's presence to give an injection intravenously or intramuscularly. Like other drugs given by rectum the dose by rectum is about five times the dose given by mouth, intravenously or intramuscularly.

Acacia solutions are effective in renal oedema, but their use is cumbersome, and it is difficult to obtain acacia solutions that do not cause a reaction.

In regard to circulatory oedema, as I have already said, digitalis is effective and should be used first. The xanthine diuretics that can be given by mouth are really very effective. We have gotten out of the habit of using them, but our therapy would be more easily carried out, if we would return to their use in cardiac cases where the oedema is in excess of that satisfactorily taken care of by the digitalis. If the xanthine diuretics do not work, then one can use the mercurials in the way I have just referred to. They are very effective.

We now come to hepatic oedema, ascites, usually from cirrhosis of the liver. Diuretics of a certain type here produce very good diuresis.

but they rarely do more than prolong the interval between the necessity of tapping the abdomen. However, that is worthwhile to the patient. Consequently, in hepatic oedema try out diuretics, to see their effectiveness. As a rule, mercurial diuretics here will be more effective than the xanthine group.

In all of these three forms of oedema, urea in large doses by mouth, sixty to ninety grams per day, may cause a satisfactory diuresis but many patients find it difficult or impossible to take urea, even if dissolved in fruit juice. It frequently causes marked nausea, often vomiting, and hence its field of usefulness is very limited.

It should be remembered in using diuretics that one may bring about too much dehydration of the body, and that as a result the patient may get into difficulty because of this. It is quite possible to have some of the tissues of the body dehydrated to the point of producing discomfort and symptoms, when other parts of the body are definitely water-logged. Too great a restriction of fluids during diuresis will do harm and strikingly often, a little fluid added to the intake will increase the urine output and even promote a large diuresis.

The cirrhotic patient with a belly full of fluid and with emaciated, dehydrated tissues is sometimes made worse by a diuretic drug and made better by a good drink of water or orange juice. The proper combination or the proper amount of fluid intake, in relation to diuretic drugs should always be kept in mind.

Practically all of these diuretic drugs also remove from the body large amounts of sodium chloride. The patient with sodium chloride deficiency in the body already is in trouble. A little judicious adding of salt to the diet of the oedematous patient often will greatly improve the general clinical condition of the patient and not infrequently a judicious sprinkling of salt on the food will increase the effectiveness of your diuretic drug.

So, in your enthusiasm for relieving the body of oedema, do not forget the discomforts and the disabilities of dehydration and deficient sodium chloride in the body.

#### DISCUSSION

PRESIDENT ABBOTT Discussion of this paper will be opened by Dr Bruce Snow of Manchester New Hampshire.

DR BRUCE SNOW First of all we want to thank Dr Christian for his kindness in coming here to speak to us today and I also want to call attention to the thoroughness with which he has covered the subject. Almost twenty years ago when as a student in medical school I was listening to Dr Christian speak to us on kidneys hearts digitalis and other fascinating subjects I was often amazed at the ex-

tensive knowledge shown and this feeling is still with me today.

When first asked to discuss this paper I hesitated to do so because I knew that after Dr Christian had spoken there would be very little for me to add. This has been amply demonstrated, but I would like to add a few observations of my own which may be, to some extent a repetition of what has been said.

I have always been deeply impressed by the many limitations in the usefulness of diuretics. We must bear in mind that—

- 1 They are not to be used in acute nephritis
- 2 They are not to be used in the milder forms of non-disabling oedema
- 3 They are not of much use in oedema of the body cavities
- 4 They are not of value in removing toxic products from the blood in nephritis, uremia and other toxemias
- 5 They are of little value in the obstructural and rarer forms of oedema

With the elimination of the above conditions there remain only two main causes for oedema: nephrosis and cardiac insufficiency. As Dr Christian has so fully brought out the oedema of nephrosis is helped not at all by the xanthine diuretics and only partially, though to a valuable extent by the mercury group, whereas cardiac oedema is greatly improved by rest and digitalis with the addition if necessary, of the xanthine and mercurial diuretics. The oedema of nephrosis is helped by the mercurials alone while cardiac oedema is aided by all types of diuretics and it is in the latter group with combined treatment that we receive our most definite results.

I think it is well to remember, however, that practically and clinically there is often no sharp dividing line between cardiac and nephrotic oedema—that many oedemas are mixtures of the two types. In the late stages of chronic glomerulonephritis we often see patients develop hypertension and cardiac damage so that the ensuing oedema is to a large extent due to the heart rather than to the kidneys. Such a type may receive great help. The practical application of this is that in all severe oedemas which are not certainly of obstructive origin it is wise to watch cautiously the successive effects of digitalis, theobromine and salyrgan for many of these oedemas will prove to have some cardiac origin and will gain marked relief if properly treated.

(Dr Walter F Taylor of Keene New Hampshire then discussed the paper and corroborated in every detail the statements made by Dr Snow.)

PRESIDENT ABBOTT If there is no further discussion of this paper I shall ask Dr Christian to close the discussion.

DR HENRY A CHRISTIAN There is just one thing that I do not think I made quite clear. That is with regard to fluid in the abdominal cavity ascites. If it is due to a blocking of the liver from cirrhosis then you do not have any very striking prolonged influence from the use of diuretics. You can produce the diuresis, but the fluid rapidly reaccumulates. On the other hand if the ascites is due to circulatory diseases that is to cardiac insufficiency digitalis and diuretic drugs singly or in combination have a very strikingly rapid effect on the removal of the fluid and when it is removed it will not recur until circulation fails again. So, you must distinguish between ascites from cirrhosis of the liver and ascites from cardiac failure the latter being particularly amenable to diuretic drugs.

## MEDICAL PROGRESS

## PROGRESS IN GASTRO-ENTEROLOGY FOR 1935

BY EDWARD S. EMERY, JR., M.D.\*

FOR a review of this kind no attempt has been made to abstract every article pertaining to the gastrointestinal tract. To do so would make a summary of this kind unnecessarily bulky, as many articles are of a statistical nature, which although useful, do not contribute anything new to our knowledge of the subject, and some are of a theoretical nature which would be of interest to only a comparatively few readers. An attempt has been made to review those articles which would seem to be of interest to the general reader. No claim is made for completeness, and doubtless certain articles were missed which could have been profitably included

## TOPICS BEARING ON THE GENERAL SUBJECT

Thomas Brown has written an article which he entitles, "The Philosophic, Clinical, and Retrospective Discussion of Certain Major Problems in the Digestive Field" which is unusually well done, shows a great deal of common sense, and should be read by everyone, whether or not he is particularly interested in the gastrointestinal tract.

Alvarez has pointed out what all physicians should remember—that many elderly persons complaining of acute indigestion may have suffered from an unrecognized cerebral hemorrhage. He believes that after a "stroke" the digestive tract may become spastic, much as an injured arm or leg is spastic, or, "storms" may go down the vagus nerve, much as they do in migraine. He gives brief histories of five patients who suffered from this type of accident with resulting digestive symptoms. In some of these cases, the true cause of the condition was not recognized for some time.

De Beer et al. have studied the composition of the intestinal secretion by making isolated loops in dogs at various levels. After allowing a sufficient time for complete healing, they have been able to follow the secretions in the unanesthetized animals. They found that the rate of secretion is greater in the jejunal and ileal loops than in the colon. The concentration of sodium, potassium and calcium is relatively constant in all the secretions, whereas, the bicarbonate and chloride ions show marked reciprocal variations. The juices in the lower ileum and colon which are known to be more alkaline than the jejunal juices, show a relatively high content of bicarbonate, and a relatively low amount of chloride, which was the reverse in the secretion

from the upper intestinal tract. They found that increasing the blood chloride by the intravenous injection of sodium chloride caused a similar change in the jejunal and ileal secretions. On the other hand, intravenous injection of sodium carbonate caused no characteristic variations in the jejunal loop.

Herrin has studied the chemical changes in the blood and in the intestinal secretions produced by the loss of intestinal juices. This article is worth reading by anyone interested in this subject.

- Brown T R. Philosophic clinical and retrospective discussion of certain major problems in the digestive field. *Am. J. Digest. Dis. & Nutrition* 2:391 (Sept.) 1935.  
 Alvarez, W C. Unrecognized strokes and the gastro-enterologist. *Am. J. Digest. Dis. & Nutrition* 2:390 (April) 1935.  
 de Beer E J, Johnston C G and Wilson D W. The composition of intestinal secretions. *J. Biol. Chem.* 108:113 (Jan.) 1935.  
 Herrin, R. C. Chemical changes in blood and intestinal juice produced by the loss of intestinal juice. *J. Biol. Chem.* 108:547 (Feb.) 1935.

*Vitamins and the Digestive Tract*

Altschule reports microscopic evidence of a deficiency of vitamin A in six of eleven infants who suffered from protracted jaundice as the result of a congenital atresia of the bile ducts, in spite of the fact that the children had received a normal diet. The findings were thought to result from a deficient absorption of vitamin A because of lack of bile.

Loewenthal, from a study of 1,000 school children in Teso, Uganda, concludes that the diarrhea and dysenteries rather commonly encountered there are not a manifestation of vitamin A deficiency, but are due to some other deficiency, the nature of which has not yet been recognized.

Sure et al. have studied the activity of pancreatic enzymes in vitamin B avitaminosis. There was a marked reduction in the efficiency of the pancreatic lipase and esterase, but no disturbance in the tryptic or ereptic activity.

Steinbach and Rosenblatt conclude that a high vitamin diet has no beneficial effect on intestinal tuberculosis.

- Altschule M D. Vitamin A deficiency in spite of adequate diet in congenital atresia of bile ducts and jaundice. *Arch. Path.* 20:345 (Dec.) 1935.  
 Loewenthal L J A. The manifestations of vitamin A deficiency in man. *Ann. Trop. Med.* 29:407 (Dec.) 1935.  
 Sure B R, Kik M C and Buchanan K S. Enzymatic efficiency in avitaminosis. *J. Biol. Chem.* 108:27 (Jan.) 1935.  
 Steinbach M M and Rosenblatt M B. Vitamin therapy in intestinal tuberculosis. *Am. Rev. Tuberc.* 31:35 (Jan.) 1935.

*X-Rays and the Digestive Tract*

Holmes and Schatzki describe the examination of the mucosa by means of the x-ray and give

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illustrations that demonstrate different types of relief patterns. They discuss the possible advantages of this type of study over the usual method.

Pendergrass and Comroe report on the roentgenologic appearance of the gastrointestinal tract in a case of chronic idiopathic adult tetany. The stomach was found to be hypertonic and showed a definite hypermotility in spite of a hypoperistalsis. The duodenum was widely dilated, the small intestine was moderately dilated, and showed considerable stasis. Little pools of barium were scattered throughout the small intestine. The valvulae conniventes were apparently hypotonic and could not be visualized. The colon appeared to be normal. (Other articles have appeared from time to time suggesting a definite change in the roentgenologic appearance of the gastrointestinal tract in such conditions as hyperparathyroidism in which the calcium metabolism is affected. The findings, as reported in these different accounts, do not agree entirely. It is difficult to say to what degree the changes depend upon the metabolic disorder. However, it seems probable that disturbances in the physiology of the intestinal tract do occur, and further observations should be made on these cases.)

Jones reports seven cases of cicatricial stenosis which occurred in the intestinal tract months or years after intensive roentgenotherapy for uterine malignancy. (This is a complication which all of us should keep in mind.)

Holmes G W and Schatzki R. Examination of the mucosal relief as a diagnostic aid in diseases of the gastrointestinal tract. *Am J Roentgenol* 34:145 (Aug) 1935.  
Pendergrass E P and Comroe B I. Roentgen study of gastro-intestinal tract in chronic idiopathic adult tetany. *Am J Roentgenol* 33:547 (May) 1935.  
Jones T E. Intestinal complications resulting from prolonged radium and x ray irradiation for malignant conditions of pelvic organs. *Am J Obst. & Gynec.* 29:309 (March) 1935.

#### ESOPHAGUS

Knight has studied the relation of the extrinsic nerves to the functional activity of the esophagus. Working with cats, he found that by cutting the fibers of the vagus which supplies the lower end of the esophagus, the animals developed a condition apparently analogous to cardiospasm. By removing the celiac plexus he was able to restore the esophagus to a normal state. Furthermore, he found that if the celiac plexus is removed before the vagal fibers are cut the animals show no tendency to develop cardiospasm. (This work supports the idea held particularly by English students that cardiospasm depends upon a faulty innervation of the lower esophagus.)

Rogers has relieved a patient with dysphagia and anemia (the so called Plummer-Vincent syndrome) of two and a half years' duration by bilateral removal of the superior cervical

ganglions. It left the patient with a bilateral Horner's syndrome. The author does not advocate it for all patients, but feels that it is worth trying on severe intractable cases.

Otell and Coe discuss dysphagia from the roentgenologic point of view and give a list of various conditions which may be responsible for this symptom. They separate the causes of dysphagia as follows:

Group 1 (most common)	Foreign bodies Achalasia of the cardia (cardiospasm) New growths Esophageal orifice hernia
Group 2 (less common)	Compression stenosis Diverticulum and pharyngeal pouches Congenital atresia Paralysis of the esophagus Cicatricial stenosis Esophageal varices Dysphagia of anemic women
Group 3 (rare)	Benign tumor Peptic ulcer of the esophagus Thoracic stomach Syphilis Tuberculosis Esophagitis Mycotic stenosis Dysphagia associated with gastric lesions Herpes and urticaria Angioneurotic edema Serum sickness Spasm of the esophagus Atony of the esophagus Globus hystericus and hysteria

MacMillan has reviewed 1,600 cases in which the patient sought relief from dysphagia. Foreign bodies were found in 181 cases. Malignancy was the complaint in 350, cardiospasm in 135, and narrowing appeared in the upper portion of the esophagus in 96. A web-like formation was present in 114 patients. Extrinsic conditions were responsible for the dysphagia in 31 patients. Strictures as the result of burns to the esophagus were found in 40. Forty-six patients suffered from paralysis of the esophagus due to such conditions as poliomyelitis, cerebral hemorrhage, brain tumor, fracture of the skull, and Parkinson's disease. Pharyngeal diverticula were found in 32 cases.

Bartels discusses acute ulcerative esophagitis. He reports on 82 cases, and states that they can be divided into the following groups:

- 1 Pseudomembranous ulceration
- 2 Simple complication with slight inflammation
- 3 Hemorrhagic ulcer
- 4 Phlegmon of the entire wall

Patterson tells of the case of a 67 year old housewife who spit up a cast of the entire esophagus. She had been complaining of symptoms for several weeks and after this episode,

her trouble gradually subsided. He was not able to determine the etiology, although the patient was known to be addicted to alcohol. The author gives a good review of the literature which will be useful for anyone looking up this subject.

Glass and Freeman report two instances of spontaneous rupture of the esophagus in patients who were suffering from "paretic seizure." Both of these patients died shortly from hemorrhage, and autopsy revealed periarteritis in the esophageal wall. The ruptures occurred during the periods of vomiting, and the authors suggest that the regurgitation of autolytic gastric contents eroded the lining of the esophagus which had been damaged by the syphilitic reaction.

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## STOMACH

### *Physiology of the Stomach*

Day and Webster have investigated the auto-regulation of the gastric secretions. This work was done on two dogs, on which was performed an esophagotomy and gastric and duodenal fistulas. The stomach was finally disconnected from the duodenum. The obstructed animals were fed in the usual manner with the food mixture described by Scott and Ivy, which was introduced into the duodenum through the fistula. In certain experiments, solutions of gastric juice of known acidity were introduced into the duodenum. These workers found that the introduction into the duodenum of 0.25 per cent hydrochloric acid or of gastric juice diluted two to four times, inhibits the gastric secretion stimulation.

- 1 By the parasympathetic nervous system
- 2 By the presence in the intestines of food substances, or the products of their digestion

The same effect was produced by the acid in some cases of hypersecretion of the gastric glands. They advance the theory that the passage of the acid chyme from the stomach into the duodenum causes gastric secretion to diminish, this being an important factor in regulating the activity of the gastric glands.

Kabat et al report that electrical stimulation

of the lateral hypothalamic area causes cessation of peristalsis and loss of tone in the stomach and small intestine. However, stimulation of the thalamus, internal capsule, anterior commissure, septum pellucidum and infundibular stalk, produced no change in the gastrointestinal motility.

Hellebrandt has found that the recurrent hunger cycles of the human fasting stomach are associated with fluctuations in the acidity of the gastric content. These two phases of gastric function, namely, motility and secretion, increase and subside in unison. Hellebrandt, this time with others, has studied the effect of acute anoxemia on the gastric functions. Acute anoxemia seems to have little inhibiting influence upon the secretion of hydrochloric acid or the other functions of the stomach. They believe that the suppression of gastric activity after exercise cannot be explained solely by anoxemia.

Bowman et al have injected various amino acids intravenously, namely, glycine, cystine, leucine, isoleucine, tyrosine, proline, tryptophane, lysine, arginine, and histidine. In the forty-three experiments that were performed on three dogs, the authors were not able to influence gastric motility, and hence conclude that the concentration of amino-acids in the blood is of no importance from this point of view.

Wilhelmj et al have studied the secretions of the stomach and duodenum. They found that the neutral chloride concentrations of the non-acid secretions of the stomach and mixed duodenal secretions were approximately the same, the average values ranging from 358 to 357 mg in 100 cc. They found also, that only about one third of the neutral chloride represents hydrochloric acid that has been neutralized. Therefore, they believe, that about two thirds of the neutral chloride found in these juices are secreted as such.

Heckmann points out that under normal conditions the fundus of the stomach is in close contact with the diaphragm. Failure to find this normal relationship may be the result of ascites, perigastric adhesions, or carcinoma of the colon, working its way between the stomach and the diaphragm. He suggests that this position of the stomach is important in regulating the pressure exerted on the gastric content.

Wayne and Graybiel conclude that eating increases the tendency to anginal pain in patients with heart disease, by increasing the amount of work which the heart has to do. They found that an average reduction of 25 per cent in exercise tolerance occurred after a heavy meal, but these same patients were not affected if the stomach was distended sufficiently to change the position of the heart. However, they found other cases in which both food and inflation of the stomach with air would bring on an attack.



They believe that this result has to be explained by some kind of reflex action

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- Wayne E J and Graybiel A Observations on the effect of food gastric distension external temperature, and repeated exercise on angina of effort with a note on angina sine dolore. *Clin. Sc* 1:257 (Nov) 1934

### Diseases of the Stomach

Sagel describes two cases which came to autopsy as the result of benign strictures of the stomach and esophagus. The first was a patient, aged 42, who died thirty-eight years after swallowing live. The second occurred four weeks after drinking moonshine. The lower esophagus in each case was scarred. The lesser curvature of the stomach was essentially normal but the pylorus and duodenum were damaged. Thick scar tissue was present on both sides of the pylorus. (The cases are interesting in showing how irritating liquids are held up in the cardia and again in the pylorus. It is also interesting that the duodenum was involved for only a short distance beyond the pylorus.)

Pendergrass and Andrews point out that by means of the fluoroscope one can usually make a diagnosis of a prolapse through the pylorus of gastric mucosa, or a gastric polyp. Errors are not infrequently made by mistaking congenital mesenteric membranes, redundant normal membranes, inflammatory adhesions, and hypertrophic pyloric stenosis for these conditions. The authors have had eight cases, in five of which they diagnosed a polyp, and in three a prolapse of the gastric mucosa. In reality a polyp was present in four and a prolapsed mucosa in four.

Levin believes that the intraperitoneal insertion of radon plus the operation of gastroenterostomy is at times of value in carcinoma of the pyloric end of the stomach. He reports satisfactory results in six cases which he observed when director of the New York City Cancer Clinic.

Gray and Melnick have determined the gastric acidity in fifty patients with pulmonary tuberculosis who were between the ages of twenty and thirty years. He believes that the disease

produces hypo acidity in one-third of the patients and an acidity in one-fourth of the patients in from one to four years after symptoms begin. Also, he states that as the acid decreases, tubercle bacilli are found more frequently in the stomach contents.

Edwards believes that gastroscopy with the Wolf-Schindler flexible gastroscope is of great assistance in studying patients with suspected carcinoma, chronic gastritis or jejunal ulcers following gastro-enterostomy.

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- Levin I Intraperitoneal insertion of radon and gastroenterostomy in carcinoma of the pyloric end of the stomach. *Am J Roentgenol* 34:109 (July) 1935
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### Diaphragmatic Hernia

Numerous papers have been written on the subject of diaphragmatic hernia of which only two have been abstracted. Dunhill has written a statistical report of twenty five cases. Eleven had an esophagus of normal length fourteen had a congenitally short esophagus and the stomach was found in the thorax. Sites of hernial orifice were as follows:

Retrosternal	1
Dome left diaphragm	2
Costovertebral region	3

Five were in the region of the esophagus, of which three were due to maldevelopment of the crura, and two to a para esophageal hiatus which had become dilated.

Einhorn et al report symptoms of cardiospasm which were the result of a diaphragmatic gastric hernia. The patient had symptoms of dysphagia and a bougie met with resistance about fifteen inches from the teeth. The true nature of the disease was missed in the first x ray examination, but a second one revealed the diaphragmatic hernia. The diaphragm was surgically repaired, with complete relief up to the time of the report.

McGill has given a good synopsis of congenital pyloric stenosis and discusses the theoretical causes of this interesting condition.

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- Einhorn M Stetten D and Stewart W H Report of case of cardiospasm due to diaphragmatic gastric hernia with ulcer operative procedure. *J Thoracic Surg* 4:510 (Feb) 1935
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### PEPTIC ULCER

#### Etiology

More experimental work has been done in 1935 to support the idea that the gastric acidity has a close association with peptic ulcer.

Harper isolated loops of the jejunum and stitched the distal end of this loop to an isolated gastric pouch and then brought the proximal end out through a stab wound in the abdomen. Reversal of the loop served to keep the mucous membrane constantly bathed with unneutralized hydrochloric acid. Ulcers developed near the anastomosis, and Harper believes that three factors were responsible for the development of the ulcerations:

- 1 The chemical action of the hydrochloric acid seemed necessary because ulcers did not develop if rapid drainage was permitted through the loop, or if the contents of the pouch were neutralized.
- 2 A mechanical factor was thought to be of importance because the ulcer developed at the point of mechanical interference with the outflow of juice.
- 3 Susceptibility of the mucosa also plays a rôle, because, as McMaster has previously reported, there was a greater tendency for ulcer to develop when one used loops from lower levels of the intestine.

(This work confirms the ideas which Williamson has already suggested.)

By making a Pavlov pouch in the duodenum of dogs, Stelzer was able to demonstrate that a high acid would produce ulcers in the duodenum. The pouch was made in the intrapapillary portion of the duodenum. Later, he made an anastomosis between this pouch and the stomach. The animals were given daily hypodermic injections of histidine for from six to eight weeks, at the end of which time the animals were killed. Typical ulcers were found in this area. It is felt by the authors that nervous influences, muscular spasms, and circulatory disturbances can be ruled out, and damage to the mucous membranes must be ascribed to the peptic action of the gastric juice.

Wu has studied the reaction of the jejunal contents after "surgical drainage of the duodenum." The jejunal contents were found to have a higher acidity, and there was a greater fluctuation in this acidity following the operation of "surgical drainage of the duodenum." Under normal conditions, he did not find that any change in acidity occurred with the development of ulcer. (This is opposed to some recent work by Ivy.)

McMaster has performed a rather interesting experiment, the results of which are hard to interpret. He produced an anastomosis between the duodenum and colon on twenty-seven dogs which survived. In sixteen of the animals the jejunum and ileum were left as a blind stump, the proximal end having been closed. Thirteen of these animals developed ulcer, three of which perforated, an incidence of 65 per cent. In eleven of the dogs the jejunum and ileum were

resected and only two of these animals developed an ulcer, an incidence of 18 per cent. It is difficult to say whether these findings are the result of anything more than chance. Further studies along these lines will be worthwhile.

Graves endeavored to compare the efficacy of bile and pancreatic secretions in the prevention of the development of experimental peptic ulcer. If Williamson's operation of "surgical drainage of the duodenum" was performed on dogs and the duodenal contents drained into the proximal portion of the stomach, no ulcer formed in the jejunum which had been anastomosed to the pylorus. An ulcer formed if "surgical drainage of the duodenum" was done and either the bile or pancreatic juice alone was drained into the jejunum. However, either of these secretions was sufficient to prevent an ulcer forming in the duodenum.

Blanck has studied the effect of exclusion of bile on the development of ulcer. He effected a complete external drainage of bile in eight dogs. Five were fed only a laboratory stock diet, while the remaining three were given the same diet plus the bile that had been collected externally. The dogs without bile feedings developed not only peptic ulceration, but the associated pathologic changes of gastritis, duodenitis, and jejunitis. By incorporating fresh bile with the feedings, both peptic ulcers and the associated pathologic changes could be prevented. (It is unfortunate that Blanck did not go a step farther and try feeding bile after an ulcer had developed in order to determine if it were possible to cause healing after the ulcer had once formed. Experiments such as these show pretty conclusively, that peptic ulcer depends upon at least two factors.)

- 1 The corrosive effect of hydrochloric acid.
- 2 The resistance of mucous membranes to the corrosion.

Unfortunately, no method has been developed, as yet, to determine which of these factors is of importance in the individual patient.)

Hoff and Sheehan have investigated the effect of damaging the hypothalamus on the intestinal tract of monkeys. Five of sixteen monkeys showed hemorrhagic erosions of the mucosa of the stomach following injury to the hypothalamus. These lesions were limited to the stomach. Three of the five showed dilatation and atony. According to the authors, these findings were not conclusive of sympathetic activity. All of the five which showed the hemorrhagic erosions were shown to have received an injury to the tuberal nuclei.

McLaughlin gives further evidence that partial bilateral destruction of the adrenals produces ulceration in the intestinal tract, especially the duodenum. He was not able to prevent this by sectioning the vagi on both sides.

Within the last few years it has become evident that the incidence of peptic ulcer is high in patients suffering from polycythemia vera. This has stimulated workers to study the blood of patients with ulcer to discover if there is any evidence of polycythemia.

Ugelli has examined the blood of ninety-two patients suffering from peptic ulcer, and reports that erythrocytosis was proved in 74 per cent of the patients with duodenal ulcers, in 40 per cent of the patients with gastric ulcers, and in 40 per cent of a group that had gastric resections performed from seven months to three years before the examination.

From Otto's study of several hundred patients with ulcer, he believes that erythrocytosis exists in a large number. (However, from some studies which the reviewer has made recently, he does not believe there is any reason to feel that the condition of peptic ulcer, as ordinarily seen, is analogous to polycythemia. It seems probable that the high incidence of ulceration in patients with polycythemia depends upon the vascular changes which are known to exist in this disease.)

Fetterman has studied thirty stomachs with ulceration for evidence of vascular lesions. Thirteen of these stomachs came from patients with duodenal ulcer and seven with gastric ulcer. Seven showed marked internal thickening of the arteries in the vicinity of the ulcer and at some distance from the ulcer. The thickening occurred in isolated areas of the stomach and which he believes were of an infective origin.

Morrison and Feldman have fed to dogs large quantities of bacteria mixed with the food. They were unable to demonstrate that this had any effect on the animals even though ulcers were produced by the injection of one per cent hydrochloric acid. The ulcers healed as rapidly as those in a control group to which no bacteria were given.

Robinson has studied patients with peptic ulcer from the point of view of racial selectivity, anthropometric selectivity, personality selectivity, sex selectivity, site selectivity. He states that there is good reason to feel that the disease can be placed on a psychogenic basis. He believes from this investigation, that the condition occurs only among susceptible individuals of the white race, usually of the long, thin type who are given to worry and nervous instability. These individuals with their fears and anxieties develop an imbalance of the vegetative nervous system, which results in vascular spasm, thrombosis, induration, ischemia and finally necrosis and ulceration.

Winkelstein has made 169 studies of the nocturnal gastric secretion on 62 cases of duodenal ulcer, 29 cases of gastric ulcer, 17 cases of gastric carcinoma, 32 cases of partial gastrec-

tomy, 5 cases with gastro-enterostomy, and 20 controls. He found that where normal individuals have little or no free hydrochloric acid during the night, the patients with duodenal ulcer, gastric and jejunal ulcer have a high nocturnal curve, and a high titre of free acid. Patients with gastric carcinoma show a low acidity with increased mucus and blood. The author was unable to control the hypersecretion and hyperchlorhydria by alkalies, olive oil, atropine, or by aspiration. The best method of controlling the secretion is by a milk drip or surgically, by means of a partial gastrectomy.

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### *Treatment of Peptic Ulcer*

Florey and Harding have made a careful and valuable study of the rate of healing of mechanical lesions produced in the duodenum of the cat. They opened the duodenum and snipped off the mucosa down to the circular muscle. They describe the various changes that occur in the process of healing, which required 180 days before the duodenum became entirely normal. (This supports the claims of those clinicians who believe that treatment of ulcer should be continued intensively for long periods of time. It is generally recognized that peptic ulcer is a chronic disease for which there is no cure, and for which treatment should stress preventive measures. The work of Florey and Harding suggests that intensive treatment for a period of at least six months is indicated if the best results are to be obtained.)

Recently much interest has been attached to the treatment of peptic ulcer with histidine monohydrochloride.

Rafsky reports that this treatment produced a marked decrease in acidity, at times to the point of anacidity in one-fourth of his cases. Symptomatic relief was obtained in 73.3 per

cent The patients who did not respond to treatment were those with a penetrating duodenal ulcer and a niche

Smith has tried the histidine treatment on twelve cases. He writes quite enthusiastically. The first symptom to disappear was discomfort. Vomiting when present was almost immediately controlled, and there was a speedy return to a desire for food in those patients who had a poor appetite.

Eads has treated thirty-five patients. Seventeen per cent showed immediate clinical and x-ray evidence of healing. Eight cases, or 27.8 per cent, improved more slowly, but nevertheless definitely. Nine cases, or 25.7 per cent, showed some clinical improvement, but no change by the x-ray. Thirty-four per cent were unimproved. (However, an improvement in 70 per cent of the cases can be obtained by almost any type of treatment, so that the results to date do not indicate that a lack of histidine is the cause of all cases of ulcer. One must remember that this treatment must of necessity be a palliative one. If the disease of ulcer depends upon a deficiency in histidine, continuous treatment with this amino acid will be necessary.)

Seely and Zollinger have resected the fundus of the stomach in four dogs leaving a tube of about 3 cm. in diameter from the esophageal opening to within 6 cm. of the pylorus. An immediate drop in the free and total acidities occurred, but these returned to preoperative levels by the end of eight months. (This confirms the work of other investigators, that a permanent lowering of the gastric acidity cannot be obtained by partial removal of the stomach.)

Rivers has treated patients with an extract from the duodenum in addition to the use of some alkali and belladonna. No striking improvement in the results of treatment has been obtained.

Gordon-Taylor believes that surgery is not used enough in cases of bleeding ulcer. He discusses surgical prophylaxis by the use of a continuous slow drip transfusion of blood. He believes that immediate operation is needed in cases with "terrific" bleeding, and where there is concomitant bleeding plus perforation. He believes in an early operation for those patients in whom drip transfusion fails to control the bleeding. He advises operation for the deep penetrating ulcer, whether the bleeding is severe or slight, and this is true also for the cases with a long, definite ulcer history, stenosis, mid gastric narrowing, and a second hemorrhage occurring within a year.

In 1931 Meulengracht started to feed patients with a bleeding ulcer. Previous to this he had treated them by the old method of starvation during the bleeding period. Since 1931, he has given an adequate diet of pureed foods and a

powder consisting of bicarbonate of soda, magnesium subcarbonate aa 150 grams plus extract hyoseyamus 20 grams. A teaspoonful of this mixture is given three times a day and in addition he gives 0.5 grams of "ferrilacta" tds. Of 251 cases, three have died. Under the former method of treatment, melena persisted for an average of 13.4 days, with an average of 4.5 defecations. Under the present method, the period of melena dropped to 10.2 days with an average of 4.8 defecations. He has observed that death from a hemorrhage due to an ulcer, occurs on the average, eight days after the hemorrhage begins.

Meyer et al. have studied the action of oil of peppermint on the secretion and motility of the stomach in patients with peptic ulcer. They find that it tends to decrease the secretion of acid and that the healing time is shortened. Although they have shown that this effect is not due to the menthol contained in the oil, they have not yet discovered just what is the cause of this action. Experiments performed on dogs with gastric pouches suggest that the oil of peppermint affects the mucosa directly.

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Rafsky H. A. Injection treatment of peptic ulcer with special reference to use of histidine monohydrochloride. *M. Rec.* 142:789 (Sept. 18) 1935.

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#### Further Statistics on Peptic Ulcer

Wright reports on a collective inquiry by the Fellows of the Association of Surgeons into gastrojejunal ulceration. Following operation for duodenal ulcer, there was an incidence of 4.14 per cent of proved jejunal ulcerations and 8.63 per cent of proved plus suspected ulcers. In the case of gastric ulcer there was an incidence of 2.32 per cent of proved jejunal ulcer and 4.48 per cent of proved plus suspected ulcers. The onset of symptoms came within two years in 62 per cent of the cases. In 285 cases the ulcer was at the anastomosis, and in 99, just beyond.

Christiansen has studied 21 fatal cases of massive hemorrhage upon whom autopsies were performed in 16. Twelve revealed erosion of fairly large arteries. The time that elapsed from the beginning of the hemorrhage varied from 3 to 30 days. Because it is hardly possible that a

patient may live for any number of hours with a continual arterial hemorrhage, it seems reasonable to conclude that the hemorrhage must have stopped some time before death, and consequently could not be the cause of death in the strictest sense of the term. The writer suggests that the cause of death in these cases may have been uremia.

A study of the death rate in New York City from 1900 to 1933 shows the interesting fact that the death rate per hundred thousand of the population, from peptic ulcer has risen from 3.69 in 1900, to 6.77 in 1933, having reached its peak, 7.51 in 1928. During this period there has been a decline in the death rate among females. In the beginning of the century it was nearly 1 to 1 for the sexes now the rate is approximately 5 males to 1 female.

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#### DUODENUM

Several patients are reported with unusual conditions of the duodenum.

Bonar observed a case of congenital atresia of the duodenum in a child 13 months of age who died following a gastro-enterostomy. At operation there was a stricture of the duodenum at the point over which the mesenteric vessels cross but this was not due to pressure from the vessels.

Nicholson studied a man 66 years of age whose complaint was jaundice. There was a mass in the right upper quadrant and ascites. X-ray studies were negative except for a diverticulum of the duodenum. Later, an autopsy revealed that the jaundice was the result of the diverticulum. The pouch was large enough for its tip to become adherent to the side of the duodenum, forming an angle at the base. This angle acted as a valve for food which entered the pouch. When full, the diverticulum pressed against the common duct.

Ockerblad and Gonzales report 1 case of their own, and review 25 others in the literature of a duodenal fistula resulting from a nephrectomy for a perinephritic abscess. There are two main causes for this condition. One is trauma to the unperitonealized duodenum with forceps. The second is the result of an abscess eroding into the duodenum. There were 12 deaths from this condition in the 75 cases previously reported in the literature.

Lawson gives a rather complete study of duodenal diverticula. By means of the x-ray he has detected 36 instances of this condition in 2,250 consecutive examinations of this organ. Fifteen

of these patients were explored, in 7 of whom the duodenum was not investigated because the surgeon was interested in some other abdominal condition. It is of interest that in the 8 patients in whom the condition was looked for, it was discovered in only 6. The writer believes that the condition is present more frequently than the x-ray reveals.

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#### LIVER

Boyce and McFetridge from a clinical and experimental study, believe that so-called 'liver death' is the result of the setting free of a water soluble toxin from the liver. This toxin particularly damages the kidney as well as other organs.

Ochsner and Debaeky have made a study of liver abscess, especially amebic abscess. Reports already in the literature vary greatly on the incidence of amebic abscess in fatal cases of amebic dysentery. However, the average for 4,392 cases was 37.9 per cent. The abscesses were sterile in 83.9 per cent and amebas were found less often in the pus than in the walls of the lesions. Pathologic studies show that these abscesses more often involve the right lobe than the left. In their own cases fever was the most common symptom. Less frequently, the patient complained of chills, sweating, weakness and so forth. The symptoms were intermittent in 7 per cent of the cases and remittent in 8 per cent. There was a previous history of diarrhea in 59.6 per cent. Local symptoms consisted of pain in the right upper quadrant, and usually enlargement of the liver. Jaundice was found to be rather infrequent. They state that the degree of leukocytosis is of value in distinguishing between amebic abscess and bacterial hepatitis or abscess. Usually, there is a moderate leukocytosis in amebic infection which may vary from 4,000 to 31,000 but averages 14,000. One expects to find a marked leukocytosis in bacterial infection of the liver. The x-ray may show a localized bulging of the diaphragm in the case of a subphrenic abscess. The mortality ranges from 4 per cent to 25 per cent, depending upon the type of treatment, and the writers advise conservative therapy whenever possible. Whenever an amebic abscess becomes secondarily infected, a fatal outcome is prone to follow. However, the best treatment is to give the patient a course of emetin, later aspirate the pus and follow with an intramuscular injection of emetin.

cent The patients who did not respond to treatment were those with a penetrating duodenal ulcer and a niche

Smith has tried the histidine treatment on twelve cases He writes quite enthusiastically The first symptom to disappear was discomfort Vomiting when present was almost immediately controlled, and there was a speedy return to a desire for food in those patients who had a poor appetite

Eads has treated thirty-five patients Seventeen per cent showed immediate clinical and x-ray evidence of healing Eight cases, or 27.8 per cent, improved more slowly, but nevertheless definitely Nine cases, or 25.7 per cent showed some clinical improvement, but no change by the x-ray Thirty-four per cent were unimproved (However, an improvement in 70 per cent of the cases can be obtained by almost any type of treatment, so that the results to date do not indicate that a lack of histidine is the cause of all cases of ulcer One must remember that this treatment must of necessity be a palliative one If the disease of ulcer depends upon a deficiency in histidine, continuous treatment with this amino-acid will be necessary)

Seely and Zollinger have resected the fundus of the stomach in four dogs leaving a tube of about 3 cm in diameter from the esophageal opening to within 6 cm of the pylorus An immediate drop in the free and total acidities occurred, but these returned to preoperative levels by the end of eight months (This confirms the work of other investigators, that a permanent lowering of the gastric acidity cannot be obtained by partial removal of the stomach)

Rivers has treated patients with an extract from the duodenum in addition to the use of some alkali and belladonna No striking improvement in the results of treatment has been obtained

Gordon-Taylor believes that surgery is not used enough in cases of bleeding ulcer He discusses surgical prophylaxis by the use of a continuous slow drip transfusion of blood He believes that immediate operation is needed in cases with "terrific" bleeding, and where there is concomitant bleeding plus perforation He believes in an early operation for those patients in whom drip transfusion fails to control the bleeding He advises operation for the deep penetrating ulcer, whether the bleeding is severe or slight, and this is true also for the cases with a long, definite ulcer history, stenosis, mid gastric narrowing, and a second hemorrhage occurring within a year

In 1931 Meulengracht started to feed patients with a bleeding ulcer Previous to this he had treated them by the old method of starvation during the bleeding period Since 1931, he has given an adequate diet of pureed foods and a

powder consisting of bicarbonate of soda, magnesium subcarbonate aa 150 grams plus extract hyoscyamus 20 grams A teaspoonful of this mixture is given three times a day and in addition he gives 0.5 grams of "ferrilacta" tds Of 251 cases, three have died Under the former method of treatment, melena persisted for an average of 13.4 days, with an average of 4.5 defecations Under the present method, the period of melena dropped to 10.2 days with an average of 4.8 defecations He has observed that death from a hemorrhage due to an ulcer, occurs on the average, eight days after the hemorrhage begins

Meyer et al have studied the action of oil of peppermint on the secretion and motility of the stomach in patients with peptic ulcer They find that it tends to decrease the secretion of acid and that the healing time is shortened Although they have shown that this effect is not due to the menthol contained in the oil, they have not yet discovered just what is the cause of this action Experiments performed on dogs with gastric pouches suggest that the oil of peppermint affects the mucosa directly

Florey H. W. and Harding H. E. The healing of artificial defects of duodenal mucosa *J. Path. & Bact.* 40:211 (March) 1935

Rafsky H. A. Injection treatment of peptic ulcer with especial reference to use of histidine monohydrochloride *M. Rec.* 142:289 (Sept. 13) 1935

Smith D. Histidine treatment of peptic ulcer of lesser curvature with note on 12 cases *Brit. M. J.* 2:154 (July) 1935

Eads J. T. Histidine in treatment of peptic ulcer preliminary report. *Am. J. Digest. Dis. & Nutrition* 2:4-6 (Sept.) 1935

Seely H. and Zollinger R. Fundusctomy in treatment of peptic ulcer experimental study *Surg. Gynec. & Obst.* 61:155 (Aug.) 1935

Rivers A. B. Use of duodenal extract as adjuvant in treatment of benign peptic lesions report of 8 cases. *Am. J. Digest. Dis. & Nutrition* 2:189 (May) 1935

Gordon Taylor G. The attitude of surgery to haematemesis *Lancet* 2:1311 (Oct. 12) 1935

Meulengracht E. Treatment of haematemesis and melena with food *Lancet* 2:1220 (Nov. 30) 1935

Meyer J. Scheman L. and Necheles H. Action of oil of peppermint on secretion and motility of stomach in man. *Arch. Int. Med.* 66:188 (July) 1935

### Further Statistics on Peptic Ulcer

Wright reports on a collective inquiry by the Fellows of the Association of Surgeons into gastrojejunal ulceration Following operation for duodenal ulcer, there was an incidence of 4.14 per cent of proved jejunal ulcerations and 8.63 per cent of proved plus suspected ulcers In the case of gastric ulcer there was an incidence of 2.32 per cent of proved jejunal ulcer and 4.48 per cent of proved plus suspected ulcers The onset of symptoms came within two years in 62 per cent of the cases In 285 cases the ulcer was at the anastomosis, and in 99, just beyond

Christiansen has studied 21 fatal cases of massive hemorrhage upon whom autopsies were performed in 16 Twelve revealed erosion of fairly large arteries The time that elapsed from the beginning of the hemorrhage varied from 3 to 30 days Because it is hardly possible that a

They tied off the common duct of cats and later released the constriction. No extensive necrosis followed this operation, and there was no evidence of any consistent correlation between the renal changes and the stasis or decompression.

- Halpert, B. O'Connor, P. A. and Thompson, W. R. Rates of resorption in the gall bladder. *Am J Physiol* 112:353 (June) 1935.
- Hawkins, W. B. and Whipple, G. H. Bile fistulas and related abnormalities: bleeding, osteoporosis, cholelithiasis and duodenal ulcers. *J Exper Med* 62:599 (Oct.) 1935.
- DeLisser, K. and Higgins, G. M. Extrahepatic biliary tract during anaphylaxis. *Am J Physiol* 112:430 (July) 1935.
- Gentile, A. Cholecystogastrostomy and hepatitis: experimental study. *Arch Surg* 30:449 (March) 1935.
- Stewart, H. L., Cantarow, A. and Morgan, D. R. Renal changes in biliary stasis and decompression in cats. *Arch Path* 19:507 (June) 1935.

### Clinical Studies

Illingworth gives a good review of the subject of carcinoma of the gallbladder and reports a personal study of 30 cases. This is worth reading by anyone who is looking up this subject.

- Illingworth, C. F. W. Carcinoma of the gallbladder. *Brit J Surg* 23:4 (July) 1935.

### PANCREAS

McNaught and Cox report the case of a 70 year old male, who died of lymphosarcoma, and in whom the pancreas surrounded the duodenum completely. Associated with this anomaly was a horseshoe kidney and an accessory spleen. They believe that this condition developed from the ventral pancreatic anlage. This is the forty-fourth reported case and this condition has been associated with other congenital anomalies in 25 per cent of the cases reported. It has not infrequently been the cause of duodenal obstruction.

Branch and Gross have reviewed the subject of aberrant pancreatic tissues occurring in the gastrointestinal tract, and add 24 cases to approximately 200 already in the literature. The pancreatic tissue was distributed as follows: In 3 instances the tissue was found in the stomach, in 10 it was located in the duodenum, in 4 in the jejunum, 1 in the ileum, and in 6 it was present in a Meckel's diverticulum. One caused pyloric obstruction, and in 3 cases it was the site of ulceration in the stomach and duodenum.

Kaplan and Chalkoff have made a further study of the liver lipids in depancreatized dogs which have been maintained with insulin. They confirm the observation of other investigators that abnormal amounts of lipids occur in the liver of such animals and that the fats disappear from the blood abnormally rapidly.

De Tarnowsky and Sarma discuss the surgical treatment of chronic pancreatitis on the basis of 30 cases. The following symptoms were present: dyspepsia in 95 per cent, pain in the right upper quadrant in 55 per cent, nausea and vom-

iting in 43 per cent, weakness and anorexia in 24 per cent. Bile was present in the urine in 18 per cent. Slight icterus was seen in 18 per cent, severe icterus in 12 per cent.

Ransom gives his findings in 16 patients suffering from carcinoma of the body and tail of the pancreas. The most common symptoms were severe pain which frequently occurred in crises, and rapid emaciation without jaundice. A tumor was palpated in half the cases. Laboratory studies were of very little help, and the roentgen ray gave a clue to the condition in only one fourth of the cases. The condition was mistaken for carcinoma of the colon more frequently than for anything else. The average duration of life for these patients was 4.7 months after being seen, and 10.2 months from the beginning of the symptoms. Surgery afforded relief frequently, but symptoms usually recurred before death.

- McNaught, J. B. and Cox, A. J. Jr. Annular pancreas: report of a case with a simple method for visualizing the duct system. *Am. J. Path.* 11:179 (Jan.) 1935.
- Branch, C. D. and Gross, R. E. Aberrant pancreatic tissue in the gastro-intestinal tract: report of 24 cases. *Arch Surg* 31:200 (Aug.) 1935.
- Kaplan, A. and Chalkoff, I. L. Liver lipids in completely depancreatized dogs maintained with insulin. *J Biol Chem* 108:201 (Jan.) 1935.
- de Tarnowsky, G. and Sarma, P. J. The surgical treatment of chronic pancreatitis. *Ann. Surg.* 101:1342 (June) 1935.
- Ransom, H. K. Carcinoma of the body and tail of the pancreas. *Arch Surg* 30:554 (April) 1935.

### JEJUNUM AND ILEUM

Nasset and Pierce have studied the influence of peptones on the secretion of the succus entericus. They found that Witte's peptone contains a potent secretagogue which given by mouth or vein, acts on the glands of the jejunum. This substance can be extracted with 70 per cent ethyl alcohol. It is digested by erepsin or trypsin, and is thermostable. It seems to be present only in Witte's peptones, as five other peptones which were studied showed little secretagogic activity.

Mackie, Miller and Rhoads believe that the small intestine shows characteristic changes by the x-ray in patients suffering from sprue. The mucosal folds of the duodenum appear thickened and the lumen is irregularly dilated. The valvulae conniventes of the jejunum are also thickened, and are more widely separated than normal. The barium passes through the jejunum slowly and irregularly. Pockets of barium can be seen in which there is no evidence of peristalsis.

Blackman reports the findings at necropsy in a 12 year old Negress who died of acute enteritis of two or three days' duration, after a large Thanksgiving dinner. Autopsy showed marked lesions in the upper part of the jejunum which decreased in severity and frequency as one approached the ileocecal valve. The upper intestine was lined with a membranous cast. The whole area was infected with *Staphylococcus al-*

Chiray and Firmin have studied the acid-base equilibrium of the human bile which was obtained by biliary drainage and preserved under oil. As a result of these studies it appears that bile is a physicochemical system somewhat similar to blood. In general, zones of alkalosis and acidosis similar to those in the blood are indicated.

- Boyce F F and McPetridge E M. So called liver death clinical and experimental study. *Arch Surg* 31:105 (July) 1935
- Ochsner A and DeBakey M. Liver abscess amebic abscess analysis of 73 cases. *Am J Surg* 29:173 (Aug) 1935
- Chiray M. and Firmin P. La réserve alcaline et l'acidité ionique de la bile humaine prélevée par tubage duodénal note préliminaire. *Arch d mal de l'app digestif* 25:233 (March) 1935

### *Anatomic Abnormalities*

Boyden has made an interesting study of congenital anomalies of the gallbladder which may result in unusual appearances with cholecystography. There are two kinds of anomalies. One is what he calls the concealed or retroserosal type which is due to an early folding of the epithelial anlage of the gallbladder behind the peritoneal investment of the embryonic fossa vesicae felleae. The second is the serosal type which is due to aberrant folding of the fossa itself. These anomalies result in abnormal appearances of the gallbladder which may appear kinked, and if one is not familiar with them may suggest that the gallbladder is deformed by adhesions. Boyden found that 18 per cent of 165 individuals had marked kinking of the gallbladder. In 24 patients this occurred between the body and the infundibulum. In 6 it occurred between the body and the fundus. From physiologic studies, he does not believe that they are the cause of pain in the right upper quadrant.

Swartley and Weeder report an interesting abnormality in which there was a cyst of the common bile duct at the point at which the gallbladder empties.

McNamee reports 2 cases in which the gallbladder was in the liver tissue. In the first case the gallbladder was in the posterior portion of the right lobe of the liver, above the kidney. In the second case the gallbladder was entirely buried in liver tissue except for a small portion of the fundus. (That such abnormalities do occur is worth remembering, if the gallbladder is not visible at the time of operation.)

- Boyden E A. Phrygian cap in cholecystography congenital anomaly of gallbladder. *Am J Roentgenol* 33:589 (May) 1935
- Swartley W B and Weeder S D. Choledochus cyst with double common bile duct. *Ann. Surg* 101:12 (March) 1935
- McNamee E P. Intrahepatic gallbladder. *Am J Roentgenol* 33:603 (May) 1935

### *Physiology of the Gallbladder*

Halpert has studied the rate of resorption which occurs in the gallbladder. Methylene

blue was given intravenously to rabbits, and the bile was forced to secrete against a constant hydrostatic pressure which he arbitrarily maintained at three different levels, namely, zero, 75 and 100 mm above atmospheric pressure. The contents were collected from the common bile duct and removed at the end of the experiment. He found that there was a greater resorption of the fluid at higher pressures. He also found that the ratio of the rate of resorption to the volume of the gallbladder contents was the same under different conditions, namely, half the volume of the gallbladder contents were resorbed in one hour.

Hawkins and Whipple report the abnormalities which occur from exclusion of bile from the intestine. These observations have been made over a series of years on animals which Whipple has used for the study of the hematopoietic system. Exclusion of the bile from the intestine may cause

- 1 Acute intestinal disturbances with rapid weight loss and even death
- 2 Purpuric tendency with spontaneous bleeding
- 3 General osteoporosis with multiple spontaneous fractures
- 4 Cholelithiasis with obstruction in the fistulous tract
- 5 Duodenal ulcer

For tendency to diarrhea they advocate a diet rich in fat and protein, plus 50 cc of fresh dog bile daily. Purpura usually develops three to four months after bile has been absent from the intestinal tract. For this condition they advocate 100 cc of whole bile per day and it may take a week before improvement results. Osteoporosis is helped by the feeding of liver. Peptic ulcer occurred in 9 of 33 dogs in which the bile had been diverted from the intestine, and which lived more than three months.

### *Diseases of Gallbladder*

Deissler and Higgins have shown that the extrahepatic biliary tract can become sensitive to anaphylaxis.

Gentile states that the hepatitis which occurs after cholecystogastrostomy depends upon the opportunity for infection which the biliary tract may acquire. Dogs' stomachs contain more bacteria than the average human stomach. He connected the gallbladder with the antrum and then separated the antrum from the body of the stomach. Then he connected the body with the jejunum. By this means the incidence of hepatitis was decreased. As a result of his studies, he is convinced that there is relatively little danger of hepatitis if the gallbladder is connected to the human stomach.

Stewart, Cantarow and Morgan have studied the renal changes which occur in biliary stasis.



Reed A C and Johnstone, H G A clinical study of intestinal fungi Am J Trop Med. 15:155 (March) 1935  
Rainey W and Cole W H. Lymphogranuloma inguinale its relation to stricture of rectum Arch Surg 30:520 (May) 1930

### DYSENTERY AND DIARRHEA

G S de Paula e Silva found 22 instances of intestinal infestation with *Giardia* in 572 patients observed in Brazil, an incidence of 3.8 per cent. The diagnosis was made in each case by drainage of the duodenum.

He points out that one does not always find evidences of the parasite in the stools when they are present in the duodenum. He lists the symptoms as follows:

- 1 Severe pain similar to biliary colic (but he was not able to rule out cholelithiasis in most of these cases)
- 2 General dyspeptic symptoms
- 3 Of 22 patients who complained of no definite symptoms, 9 had regular bowel movements, 4 had alternating constipation and diarrhea, 6 had attacks of diarrhea and 2 had obstinate constipation
- 4 Systemic symptoms which could not be associated with the intestinal tract (Apparently it is difficult to determine how important this parasite is in the production of gastrointestinal symptoms. One can only say that at times it is responsible for symptoms, and the possibility of its presence should be kept in mind.)

MacPhee and Walker discuss the general problem of intestinal infestation with *Giardia intestinalis*. The authors have found only 6 cases of this condition in 732 patients upon whom a routine bile drainage was done, an incidence of 82 per cent. This is lower than a previous report by Burke who studied children in the Childrens' Hospital in Boston. This author found an incidence of 14 carriers among 80 miscellaneous medical admissions. The 6 cases reported by the present authors complained of abdominal symptoms of various types, so that no characteristic symptoms could be associated with the infection.

It must be accepted that amebic dysentery has become endemic in the United States. Hence, the study of Wenrich et al is of interest, on the incidence of *Endameba histolytica* among a group of college freshmen. Thirty-four and five tenths per cent of 1,060 freshmen were found to harbor one or more kinds of protozoa and 4.1 per cent were shown to have *Endameba histolytica*. In spite of this fact, no cases of amebic dysentery were reported in the university among the carriers or noncarriers.

Callender stresses the type of stool that the patient with amebic dysentery is having as a guide to the medicine which should be used in its treatment. He believes that the arsenicals increase the amount of inflammatory exudate in the stools and suggests that the presence of pus is evidence of a secondary infection. When a patient with amebic dysentery is showing much pus, emetin is indicated, whereas, the arsenicals such as carbarsone are of value when little pus is present.

From a review of 100 cases, Bockus discusses the pathogenesis of idiopathic ulcerative colitis. He classifies the disease into:

- 1 The chronic relapsing type
- 2 The chronic continuous type
- 3 The acute fulminating type
- 4 The early healing type

He believes that a positive diagnosis can be made only by the use of the sigmoidoscope, but declares that a barium enema is of paramount importance in ascertaining the extent and degree of involvement. In a discussion of the etiology, he states that the habitus of the individual seems of little consequence. He stresses the necessity of giving consideration to the emotional or psychogenic factor in patients with this disease. From a study of foci of infection he has not been able to determine any type of infection which is common to the group. Animal inoculations in his clinic have failed to establish the specificity of the streptococcus in ulcerative colitis. He favors the contention of Hurst and others, that dysentery bacilli play an important rôle in the initiation of chronic ulcerative colitis, and states that these organisms must be considered as possible initial invaders.

Bargen and Dixon believe that when carcinoma develops on the site of chronic ulcerative colitis it is best to resect the entire colon rather than to attempt a local resection.

Haskell and Cantarow report further results on the treatment of ulcerative colitis with calcium supplemented by parathyroid therapy. They administer 60 grains of calcium gluconate 3 to 4 times daily, 3½ to 4 hours after meals. Parathormone is injected intramuscularly, the average adult dose being 20 units. These injections are repeated at intervals of 48 to 72 hours, depending upon the severity of the symptoms. These patients have been observed for periods of from 2 to 6 years. Five have remained essentially symptom free. Brief remissions occurred in two instances which, however, promptly responded to the same form of treatment. Sixteen patients have been observed from 6 months to 4 years. Eight became clinically well, 7 were relieved of their severe symptoms, and 1 patient was not benefited. Although the response to treatment is usually prompt, definite improvement occurred in 3

*bus* Microscopic examination revealed a diffuse superficial necrosis with acute inflammation of the entire mucosa of the jejunum and ileum. Septicemia was the cause of death.

Price followed a patient with a carcinoid tumor of a Meckel's diverticulum. He was able to find, in the literature, only two reports of a similar condition. The patient died of an intestinal obstruction at the age of 54 years.

Nasset E S and Pierce H B. On the influence of pectones and certain extracts of small intestine upon the secretion of succus entericus. *Am J Physiol* 113:568 (Nov.) 1935.

Mackie T T, Miller D K and Rhoads C P. Sprue—roentgenologic changes in the small intestine. *Am J Trop Med* 15:571 (Sept.) 1935.

Blackman S B Jr. Acute staphylococcal infection of the jejunum and ileum. *Bull Johns Hopkins Hosp* 57:289 (Nov.) 1935.

Price J. Carcinoid tumor of Meckel's diverticulum: report of case. *Brit J Surg* 23:130 (July) 1935.

### COLON

Sparks and Collins have repeated the work of Hargreaves, Fletcher, and Dickson when studying the effect of vitamin B on the tonus of the colon. The degree of tonus was determined by measuring the amount of barium needed to fill the colon as seen under the fluoroscope. The normal volume of the colon of adult rats is from 30 to 45 cc. The volume of the colon of rats maintained on a diet deficient in vitamin B<sub>1</sub> increased strikingly in 70 per cent of the animals. No such change occurred in a control group maintained on a complete synthetic diet.

Oppel reports the case of a 22 year old boy who died from a congenital megacolon. The intestine was of enormous size and the history and autopsy point to compression of the heart and lungs as the cause of death.

Stabins, Morton, and Scott believe that spinal anesthesia is of use in the diagnosis and treatment of megacolon and obstinate constipation. By using spinal anesthesia in patients in whom the cause of a large colon or obstinate constipation is not clear, one is able to demonstrate when an excess of sympathetic activity plays a dominant rôle.

Mitchell has made a study of the innervation of the distal colon by dissection on 15 stillborn babies. Included in this article are 6 photographs and 2 sketches. He concludes that the distal colon receives its nerve supply from the inferior mesenteric plexus and the hypogastric plexus. The former, or inferior mesenteric plexus supplies mainly, or possibly, all the sympathetic fibers. The hypogastric nerves and plexus supplies both sympathetic and parasympathetic fibers, but chiefly the latter.

Slavin calls attention to the fact that paralyzing the diaphragm by phrenicotomy may result in the liver receding from the diaphragm. In one of two cases which he has observed, the colon assumed a position between the liver and the diaphragm. Although the patient had no symptoms, colonic gas was noticed in this area.

Several articles have been written on the intestinal flora.

Petran from a study on monkeys and dogs, was unable to demonstrate that bile had any effect on the intestinal flora. On the contrary, lactose stimulated the growth of acidophilus organisms.

Jordan and Burrows have made the rather interesting observation that many of the organisms found in the intestinal tract can produce an enterotoxin when grown under suitable conditions. This is true of the staphylococcus, streptococcus, proteus, and colon bacteria, the aerogenous organisms and *Salmonella aertrycke*. Organisms which have been cultured for some time and show no evidence of this tendency, can regain it if they are cultured in a suitable way. (Such a discovery suggests that it is possible for persons to develop a condition of auto intoxication, but further work must be done before one can improve the treatment of such a condition when it is suspected.)

Althausen et al have studied the flora in patients with obvious intolerance for carbohydrates. They have been unable to show any change from the normal flora. (This finding would agree with the observations of Schmidt and Strassburger, that carbohydrate intolerance depends upon a digestive disturbance in the upper intestine.)

Except in isolated instances, little attention has been paid to the fungi as a possible cause of digestive disturbances. Therefore, it is of interest that Reed and Johnstone have attempted to investigate this problem. They have studied the fungi present in the intestines of patients who were in otherwise good health and were suffering from various intestinal disturbances. They were able to isolate fungi from the intestines of about 52 per cent of the individuals they studied. However, the authors were unable to show that the presence of these fungi was the cause of, or influenced, any disease process that might be present.

Ramey and Cole conclude that the rectal strictures which are so commonly found among Negro women are the result of lymphogranuloma inguinale.

Sparks M I and Collins I N. The rôle of vitamin B<sub>1</sub> in tonus of the large intestine. *Am J Digest Dis* 4: Nutrition 21:18 (Dec.) 1935.

Oppel J. Congenital megacolon. *Am J Path* 11:375 (March) 1935.

Stabins S J, Morton J J and Scott W J M. Spinal anesthesia in the treatment of megacolon and obstinate constipation. *Am J Surg* 27:107 (Jan.) 1935.

Mitchell G C. The innervation of the distal colon. *Edinburgh M J* 42:111 (Jan.) 1935.

Slavin I. Interposition of the colon following induced phrenic paralysis. *Am J Roentgenol* 33:181 (April) 1935.

Petran E. Intestinal flora of monkeys and dogs during digestion and following direct introduction of food substances into the cecum and into isolated segments of the bow. *J Infect Dis* 57:1-26 (Nov-Dec.) 1935.

Jordan E O and Burrows W. The production of enterotoxic substance by bacteria. *J Infect Dis* 57:111 (July-Aug.) 1935.

Althausen J J, Gunnison J B, Marshall M S and Shipman S J. Carbohydrate intolerance and intestinal flora: clinical study based on 60 cases. *Tr Am Gastro-Enterol A* 36:143 1935. *Arch Int Med* 65:1163 (Dec.) 1935.

- Reed, A. C. and Johnstone, H. G. A clinical study of intestinal fungi. *Am J Trop. Med.* 13:155 (March) 1935  
Rainer, W. and Coe, W. H. Lymphogranuloma inguinale its relation to stricture of rectum. *Arch Surg* 50:520 (May) 1935

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cases, only after 3 months of continuous calcium and parathyroid administration

In the April and May issues of the *American Journal of Digestive Diseases and Nutrition*, is a comprehensive article by Sibrand Lups, of Gioningen, Holland, which has been translated and edited by A. J. Baker, on the subject of Vaccine Therapy in Ulcerative Colitis. This article is too long to summarize thoroughly.

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- Wenrich D. H., Stabler R. M. and Arnett J. H. Endamoeba histolytica and other intestinal protozoa in 1060 college freshmen. *Am J Trop Med* 15:331 (May) 1935.
- Callender G. R. Amebic dysentery exudate as a guide to treatment. *Am J Trop Med* 15:189 (March) 1935.
- Bockus H. L. The pathogenesis of idiopathic ulcerative colitis. *Delaware State M J* 8:1 (Jan) 1936.
- Bargen J. A. and Dixon C. F. Chronic ulcerative colitis with associated carcinoma. progress in management. *Arch Surg* 30:1854 (May) 1935.
- Haskell B. and Cantarow A. Further studies in calcium and parathyroid therapy in chronic ulcerative colitis. *Am J M Sc* 190:676 (Nov) 1935.
- Lups Sibrand. Vaccine therapy in ulcerative colitis. *Am J Digest Dis & Nutrition* 2:165 (April) 1935. 2:139 (May) 1935.

- Denison G. A. and deHoll G. Bacillary dysentery in infants and children. clinical and bacteriologic study of 35 cases. *J Infect Dis* 56:124 (March April) 1935.
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## APPENDIX

Snyder et al. have made an interesting study of the association of pylephlebitis and appendicitis. They summarize this work as follows:

"Chills in appendicitis cases operated upon early (within thirty-six hours of onset) do not necessarily signify the development of pylephlebitis. Two and one tenth per cent of all our cases of acute appendicitis had chills. Acute appendicitis of several days' duration associated with chills is likely to be followed by pylephlebitis. This occurred in forty per cent of such patients in our series. The incidence of pylephlebitis following appendicitis in our hospital was 3 of one per cent. Approximately one patient in six having chills during the attack of appendicitis developed pylephlebitis. When pylephlebitis occurs it is usually in neglected cases or in those in which the appendix is not removed early. The average time after the onset of symptoms of appendicitis before operation was performed was 7.7 days. The average time in our series after the onset of symptoms of appendicitis before pylephlebitis developed to a point where the diagnosis could be made, was 13.3 days. Histological study of the appendix mesentery is of little value in determining the development of pylephlebitis. The clinical evidence and the gross appearance of the local lesion at the time of operation are often characteristic. Ligation of the ileocolic vein is recommended in carefully selected cases."

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- Mead C. H. Mesenteric lymphadenitis simulating acute appendicitis. quantitative study of size of normal mesenteric lymph nodes. *Arch Surg* 30:1492 (March) 1935.

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# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 22421

## PRESENTATION OF CASE

*First Admission* A 73 year old postman was admitted complaining of pain in the abdomen.

The patient was perfectly well until 3 days before coming to the hospital, at which time he lifted a heavy weight and noted shortly afterward a sensation of soreness localized to the right upper quadrant. On the first day of his illness he vomited large amounts of yellowish bitter fluid. There was persistent nausea and marked anorexia. Bowel movements, which usually occurred daily, had not occurred for 2 days before entry. There were no other associated symptoms.

Physical examination showed a slender, well nourished elderly man in no apparent discomfort. There was moderate sclerosis of the peripheral vessels. The lungs were clear and the heart normal. The blood pressure was 160/80. The abdomen was distended and tympanitic. There was marked tenderness and spasm in the right upper quadrant and a questionable mass was palpated in this region.

The temperature was 99.8°, the pulse 130. The respirations were 22.

Examination of the urine showed a specific gravity of 1.030 with a slight trace of albumin. The sediment was negative. The blood showed a white cell count of 23,000. Examination of the stools was negative.

A plain film of the gallbladder region showed no shadow significant of disease of that organ.

Subsequently the patient's temperature showed a daily rise of 100° and his pulse and temperature remained elevated. Subjectively however, he became more comfortable and on the seventh day a laparotomy was performed. At operation a large pericholecystic abscess containing several ounces of odorless pus was found and the gallbladder wall appeared to be necrotic. The gallbladder was opened and a large amount of detritus and a dozen small stones were removed. Normal yellow bile was aspirated from the cystic duct. A tube was sutured into the gallbladder and drains were placed in the abscess cavity. The patient had a stormy immediate postoperative course during which he had col-

lapse of the right lower lobe. He made a good recovery, however, and was discharged on the twenty-seventh hospital day.

*Second Admission*, one year later

The patient remained quite well after leaving the hospital until one week before re-entry. At this time he began to notice some gaseous eructation, indigestion, and a gradually increasing jaundice. There was no abdominal pain but he did have some aching pain in the lower back. There were no chills, fever, nausea, or emesis. The upper portion of his abdomen appeared to be hard and bulging. There was some increasing readiness of fatigue and a loss of about 10 pounds during the preceding 2 months. Bowel habits and micturition were unchanged.

Physical examination showed a deeply jaundiced man in no acute discomfort. The heart and lungs were unchanged. The abdomen was distended, tense, and tympanitic. The scar of the previous operation was well healed. Motion of the spine caused pain in the lower portion of the back. Rectal examination showed a rather firm, medium-sized, nonfixed prostate, the left lobe of which was slightly larger than the right.

The temperature was 100°, the pulse 110. The respirations were 20.

Examination of the urine showed a trace of albumin but was otherwise negative. The blood showed a red cell count of 2,990,000 with a hemoglobin of 60 per cent. The white cell count was 8,700. 61 per cent polymorphonuclears. The smear showed marked poikilocytosis, anisocytosis and a rare stippled red blood cell. A reticulocyte count was 6.9 per cent. Hematocrit studies showed the average red cell volume to be considerably below normal. Stool examinations showed an occasional positive reaction to the guaiac test but were otherwise negative. Bile was present. A van den Bergh test showed 11 milligrams bilirubin. Duodenal drainage sediment contained moderate amounts of bilirubin crystals and there was a very high pigment content.

X-ray examination showed numerous rounded areas of new bone formation in the bones of the pelvis, lumbar spine, and thorax. The large bowel was filled with gas down to the rectum. A chest film was negative.

The patient continued to run a low grade febrile course. He was given liver extract and the reticulocyte count rose to 9.0 per cent and the red cell count of the blood rapidly dropped to 1,680,000, with a hemoglobin of 45 per cent. The white cell count rose to 18,000, with 52 per cent polymorphonuclears, 4 per cent myelocytes, 29 per cent lymphocytes, 2 per cent monocytes, and 13 per cent normoblasts. Genito-urinary consultants did not believe that the prostate was malignant. The icterus index gradually dimin-

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The abdomen was distended but the note that it was tympanitic would seem to rule out abdominal fluid as the cause of the distention. There was no suggestion of obstruction from the history.

"Motion in the spine caused pain in the lower back." That may or may not mean something. A man with malignant metastases of the spine generally complains of not being able to turn over in bed. That is one of the major complaints. I still have no good suggestion as to what this process is. I was thinking of the possibility of bile peritonitis. There is no definite evidence of fluid in the abdomen.

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If we just took the blood examination without any thought of the history or patient or anything else, it would be consistent with hemolytic jaundice of some type. In regard to the urine, it says it was negative except for the albumin. Presumably there was no bile as such in the urine although probably there may have been urobilinogen. I do not believe they tested for it. That is not the anemia of infection, and we rule out obstructive jaundice. Incidentally the physical examination did not reveal any definite mass, nor did it tell us what the size of the liver was.

The x-ray man apparently considered the bones to be characteristic of metastatic malignancy, particularly of the type that is seen with carcinoma of the prostate, since it was an osteoplastic rather than an osteoclastic lesion.

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appearance of jaundice, an anemia which shows considerable red cell activity and an x-ray examination suggesting metastatic disease of the bone with some discussion in regard to the prostate. The anemia could be due to metastatic disease alone. I do not believe it was the so-called primary type. It certainly was not pernicious anemia. It seems very unlikely that this man would develop hemolytic jaundice. I do not see any point in bringing in that diagnosis. We must assume he has intrinsic liver pathology with considerable destruction of liver tissue that may result in anemia, and there is probably involvement of the bone marrow itself by some malignant process. He may have died of liver failure although the jaundice all cleared up. There is one other possibility here, that is drugs. No mention is made in the history so I would rule that out.

I really have no diagnosis to offer in this case. In the first place I do not feel sure as to the cause of his abscess. He could have a primary malignancy of the liver which may occur in these cases that have had gallstones or long standing. I am going to say that he had malignant disease with liver destruction with the source of the malignancy not definite, though I am going to express the suspicion that we may be dealing with primary malignancy of the liver.

A PHYSICIAN: Is it not possible that the first process could be an independent affair and separate from the malignancy?

DR. RICHARDSON: I think it is possible with a year of relative freedom in between, but it is all such an obscure story that one feels a proper diagnosis had better include that episode as a part.

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#### CLINICAL DIAGNOSIS

Metastatic carcinoma of the prostate

DR. WYMAN RICHARDSON'S DIAGNOSIS

Malignant disease (? primary in the liver)

#### ANATOMIC DIAGNOSES

Carcinoma of the prostate with metastases to the vertebrae, the liver, and the regional and infrahepatic lymph nodes

ished to 46 milligrams and the patient was discharged on the eleventh hospital day

*Final Admission*, twelve days later

Following his discharge the patient rapidly lost weight and strength. The jaundice diminished rapidly and was replaced by a pronounced pallor. The pain in the lower back increased and became more troublesome.

Physical examination showed an obviously ill man with faint yellowish pallor. A few small hemorrhagic spots were noted in the conjunctival sacs and buccal mucous membrane. There were no other significant changes. The blood pressure was 135/60.

The temperature was 101°, the pulse 120. The respirations were 22.

Examination of the urine was negative. The blood showed a red cell count of 1,300,000, with a hemoglobin of 45 per cent. The white cell count was 22,000, 80 per cent neutrophils. There were a few immature myeloid cells and normoblasts.

The temperature rose gradually to 103° and the pulse to 160. He became rapidly weaker and died on the fourth hospital day, a little more than a year after his first entry.

#### DIFFERENTIAL DIAGNOSIS

DR. WYMAN RICHARDSON: The first question we have to answer is whether trauma had anything to do with this patient's entry.

Aside from a diaphragmatic hernia as the result of trauma, which I think would be very rare, I do not see the relationship between his lifting a heavy weight and the symptoms. There is some suggestion of intestinal obstruction.

"On the first day of his illness he vomited large amounts of yellowish bitter fluid." If this is accurate it certainly would rule out pyloric obstruction because "yellow bitter fluid" presumably would contain bile.

"The blood pressure was 160/80." He has a high pulse pressure as so many of the people with peripheral arteriosclerosis have.

As you know, palpation of the upper quadrants is extremely difficult. It is always difficult to be sure of spasm in the right upper quadrant but in this case the note is made that there was marked tenderness and spasm in the right upper quadrant. We will take it as a fact that there was some peritoneal irritation in that region. I think we will have to let the questionable mass go. If there was spasm it would be even more difficult to feel the mass. So we have to try to explain what may be intestinal obstruction and what may be peritoneal inflammation in the right upper quadrant.

The physical examination is really lacking in one regard, that is, no rectal examination was done. At least there is no record in the summary. We will assume that it was done and

nothing definite was discovered. We would like to know whether there were feces in the rectum or marked rectal tenderness.

"Examination of the stools was negative." That is important. He must have passed stools in the hospital. We do not know whether he passed gas but that is definite evidence that he did pass stools.

I find it difficult to be dogmatic about the diagnosis.

The supposition is that he has something in the right upper quadrant. I suppose it might be an ulcer. There is no suggestion of ulcer history and no suggestion of perforation with peritonitis, unless it is well localized. Usually with peritonitis there is an extension of the signs and symptoms to the lower abdomen. From that story one would be inclined not to wait long for operation. I am not at this point able to guess what was done. We will read on and see what the subsequent course was.

It says here that the gallbladder wall appeared to be necrotic. That leaves us with the distinct suspicion that possibly some large stone escaped through the gallbladder wall, but there is no mention made of any large stone being found. We will look with interest at the future course of this patient to see if the large stone is lost somewhere in the abdomen.

A PHYSICIAN: Why do you think it was ruptured?

DR. RICHARDSON: It may have been intact.

DR. MALLORY: I do not think they found any gross communication between the pericholecystic abscess and the gallbladder. The gallbladder was reported as containing normal looking bile as well as gallstones and the pericholecystic abscess contained pus which was not bile stained.

A PHYSICIAN: It could not, therefore, have been a communication between the gallbladder and the abscess cavity.

DR. RICHARDSON: That is a rather curious situation, it seems to me, to have a definite abscess around a gallbladder which showed so little evidence of being intrinsically infected. Perhaps the gallbladder is not the cause of the abscess at all. We have to consider other causes of that abscess. He had no gastrointestinal x-ray during his stay in the hospital. Just where the pus in that region came from, I do not feel sure, unless from the gallbladder. He still might have had a ruptured localized ulcer. There is no evidence of pyelephlebitis that I can see.

With regard to the second admission it would be perfectly all right to have a gradually increasing jaundice, but all the important features in regard to the symptoms, or many of them, do not appear. What we want to know particularly is whether this is obstructive jaun-



dice or not. We may be able to tell from the laboratory findings later. One would like to know about that and whether the patient noticed bile in the urine. One cannot be sure whether it is intrinsic liver disease or obstructive jaundice from some process causing fibrous obstruction as a result of the abscess or operation or some other process.

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#### ANATOMIC DIAGNOSES

Carcinoma of the prostate with metastases to the vertebrae, the liver, and the regional and infrahepatic lymph nodes

Benign hypertrophy of the prostate, median bar

Lipomatous polyp of the ascending colon

Pleuritis, chronic fibrous, left

Peritonitis, chronic fibrous, localized

Chronic cholecystitis

Cholelithiasis

Diverticulosis of the colon

Operative scar, cholecystostomy

#### PATHOLOGIC DISCUSSION

DR TRACY B MALLORY I might mention the fact that this patient was a doctor's father and almost anyone in medicine knows that fathers of doctors always have the most difficult conditions to make head or tail of. The men on the ward finally decided to side with the x-ray department against the genito-urinary department and, in spite of the statement of the head of the genito-urinary service that he did not think the prostate was malignant, they finally signed the patient out with the diagnosis of carcinoma of the prostate with metastases, and that was what we found at autopsy. I would be embarrassed if you were to ask me to demonstrate that fact, however. The prostate showed an ordinary benign hypertrophy except for one quite small area not more than 5 millimeters in diameter that was located deep in the gland, so it was natural that the examining finger in the rectum should have felt the benign hypertrophy and not this single firm nodule. We made a frozen section of it at the time of the autopsy and several of us who saw it agreed there was no doubt that it was malignant. We put through ten other blocks, however, for paraffin sections and could not find cancer in any of them. However, I feel quite certain that the cancer was primary there. Tumor was very obviously present throughout the bone marrow and was so characteristic in type that it would be fairly safe to commit oneself to a diagnosis of prostatic malignancy on the sections of the vertebrae alone.

The findings as regards the liver and bile passages were a little disappointing. They had left his gallbladder in at the previous operation and there were of course adhesions around it. The bile ducts were all patent. The gallbladder contained bile and inside the gallbladder and within all the small bile ducts in the liver were very numerous crystals of bilirubin, essentially similar to the ones that had been aspirated from the duodenum at one time, but nothing else. The liver parenchyma was normal, so that the only explanation I can give for his jaundice is that this crystalline bilirubin was thick enough in some places to make a sort of mud in the bile ducts. I believe I have seen such a phenomenon produce jaundice in other cases and perhaps variations in the concentra-

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A PHYSICIAN Is there any explanation of the abscess?

DR MALLORY No, that was completely healed at the time of autopsy.

A PHYSICIAN Do you think he had tumor invasion of the bone marrow at the time of his first entry?

DR MALLORY One can only guess. Cancers of the prostate on occasion can grow very fast but by and large they are among the slowest growing types of malignancy.

Have you any suggestions, Dr Richardson?

DR RICHARDSON No the hemolytic element here seems extraordinary. It is interesting and unquestionably I think we have to assume he had excessive hemolysis.

I wonder if it is possible for a man to live seventy years with a latent hemolytic jaundice that is brought out by other disease.

DR MALLORY We have learned that the spleens of hemolytic anemia cases are very characteristic histologically and there was none of the characteristic picture in this case.

I forgot to mention one thing which might easily have complicated the story much more for Dr Richardson. He had a lipoma of the large bowel and numerous diverticula of the

large bowel If they had done a barium enema and shown up the bowel lesion we would have had a still better case

## CASE 22422

## PRESENTATION OF CASE

A 66 year old English housewife entered complaining of abdominal pain

About one year before entry the patient first noted that her stools appeared to be grooved There was constipation of many years' duration The condition continued without much change and about 3 months ago she began to have attacks of cramp-like abdominal pain, each attack of which lasted for about 3 days The pain was most marked in the right upper quadrant but was not associated with nausea or vomiting There was no weight loss Occasionally the stools appeared to be blood-streaked

The patient lived in India during her childhood and had had cholera, smallpox, and "jungle fever" Twenty-two years ago she was operated upon for a fibroid tumor and her menses ceased abruptly after this operation

Physical examination showed a well-developed and nourished, obese, elderly woman, weighing 240 pounds, in no evident discomfort There was kyphosis of the dorsal spine with slight chest deformity The heart was not enlarged but a soft apical systolic murmur was audible The blood pressure was 198/50 The lungs were clear Abdominal examination showed a well-healed lower midline scar but the abdominal wall was soft, flaccid, and there were no palpable masses or tenderness A vaginal examination was essentially negative Rectal examination showed a few small, non-tender hemorrhoids and proctoscopy exhibited a normal rectal mucosa up to the lower portion of the sigmoid Beyond this point it was impossible to pass the proctoscope but no abnormality of the bowel could be recognized except for considerable narrowing and a plug of mucus occluding the passage

The temperature, pulse, and respirations were normal

Examination of an uncatheterized urine specimen showed a specific gravity of 1.020 with a trace of albumin The sediment contained occasional red and white blood cells but was otherwise negative The blood showed a red cell count of 4,900,000, with a hemoglobin of 85 per cent The white blood count was 7,600, 61 per cent polymorphonuclears

A chest x-ray showed the diaphragm in the usual position There was relative brightness of the lung fields but the pulmonary vascular markings were increased, and the left ventricle was prominent The aortic knob was sclerotic and the aorta tortuous

On the third hospital day a laparotomy was performed

## NOTES ON THE HISTORY

DR ROBERT R LINTON In reviewing this case it seems to me the most obvious thing that was troubling this patient was some degree of intestinal obstruction The history is not a very adequate one This makes it difficult to make a diagnosis

The first statement I should like to comment upon is that she had noticed that her stools were grooved I doubt if that means anything at all It used to be taught that ribbon-like stools were diagnostic of carcinoma of the rectum, but I do not believe that the type of the stool has anything to do with carcinoma of the rectum or any condition in the rectum It is more a matter of consistency of the stool and the tone of the sphincter

The fact that she had had constipation for many years does not mean anything That statement could apply to a great many people who have nothing very seriously wrong with them

Of the most importance I think is the fact that she had had cramp-like abdominal pain, each attack of which lasted 3 days The pain was localized in the right upper quadrant which you would naturally associate with gallbladder disease However, there is nothing more to substantiate the diagnosis of gallbladder disease, so I do not see how I can follow that up any further

She noticed that her stools were blood-streaked That again draws our attention to the colon It does not say whether it was fresh blood but I presume it was and I think that is most likely explained by the rectal examination, which showed a number of internal hemorrhoids

Her past history we can say has nothing to do with the present illness

The physical examination is of interest because I can see nothing of any great importance except that she was an obese woman weighing 240 pounds at the age of 66 She had a moderate degree of hypertension for that age and for a woman of that size and build

The x-ray showed marked arteriosclerosis Abdominal examination was surprisingly negative I doubt that moderate distention could have been detected even though it were present, because of the obesity One would like to know whether there was thought to be any distention and also what the auscultatory signs over the abdomen were, but I see no mention of them The vaginal examination and the rectal examination, aside from the hemorrhoids, were essentially negative The proctoscopy was also negative, except for the lower end of the sigmoid,

Benign hypertrophy of the prostate, median bar  
 Lipomatous polyp of the ascending colon  
 Pleuritis, chronic fibrous, left  
 Peritonitis, chronic fibrous, localized  
 Chronic cholecystitis  
 Cholelithiasis  
 Diverticulosis of the colon  
 Operative scar, cholecystostomy

### PATHOLOGIC DISCUSSION

DR TRACY B MALLORY I might mention the fact that this patient was a doctor's father and almost anyone in medicine knows that fathers of doctors always have the most difficult conditions to make head or tail of. The men on the ward finally decided to side with the x-ray department against the genito-urinary department and, in spite of the statement of the head of the genito-urinary service that he did not think the prostate was malignant, they finally signed the patient out with the diagnosis of carcinoma of the prostate with metastases, and that was what we found at autopsy. I would be embarrassed if you were to ask me to demonstrate that fact, however. The prostate showed an ordinary benign hypertrophy except for one quite small area not more than 5 millimeters in diameter that was located deep in the gland, so it was natural that the examining finger in the rectum should have felt the benign hypertrophy and not this single firm nodule. We made a frozen section of it at the time of the autopsy and several of us who saw it agreed there was no doubt that it was malignant. We put through ten other blocks, however, for paraffin sections and could not find cancer in any of them. However, I feel quite certain that the cancer was primary there. Tumor was very obviously present throughout the bone marrow and was so characteristic in type that it would be fairly safe to commit oneself to a diagnosis of prostatic malignancy on the sections of the vertebrae alone.

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in fact it did not occur to me as being very likely. I did feel that she was a poor surgical risk but that here was a tumor which had better be taken out if possible.

#### PREOPERATIVE DIAGNOSIS

Carcinoma of the sigmoid

DR. ROBERT R. LINTON'S DIAGNOSES

Carcinoma of the sigmoid

Diverticulitis?

#### PATHOLOGIC DIAGNOSIS

Diverticulitis of the sigmoid

#### PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY The specimen which we received after the operation was a segment of the lower end of the sigmoid. It was

extraordinarily narrow, not even a lead pencil could be passed through it. At first glance the mucosa seemed almost normal, but as one pried it apart one could see the mouths of numerous diverticula some of which contained fecoliths. The wall of the bowel was very thick and fibrosed and the scar tissue extended out into the fat, making a hard indurated mass that undoubtedly would have felt essentially like malignant disease at the time of exploration.

Microscopic examination showed on the whole a very surprisingly small amount of inflammatory reaction. We have seen within the past year at least one other case of multiple diverticula with obstruction and very little inflammatory reaction. The obstruction seems to be due to a large extent to fibrosis—but of course it is not possible for a pathologist to rule spasm in or out.

where narrowing was noticed and a plug of mucus was seen occluding the passage

Laboratory examination is of interest chiefly on account of the red cell count, which was perfectly normal, and a normal white count

#### DIFFERENTIAL DIAGNOSIS

As to the question of diagnosis, it seems to me the lesion would most likely lie in the colon and I think the possibilities that are to be considered are carcinoma of the colon, diverticulitis, or perhaps some extrinsic cause of obstruction. I think I can rule out the latter very quickly as there is no evidence pointing toward it, either from abdominal, pelvic or rectal examinations. I think the diagnosis lies between the other two diseases, and in favor of diverticulitis I should say is the fact that there has been practically no bleeding. It is true that some people say that bleeding never occurs in diverticulitis. I think that probably is not true, as it occasionally does occur and there are figures that suggest that anywhere from 3 to 18 per cent may show bleeding. However, there certainly was very little bleeding in this case. It was noticed that there was narrowing of the lumen of the sigmoid which is perfectly consistent with diverticulitis, and it seems to me the presence of mucus occluding the lumen of the bowel would be rather in favor of a benign lesion, especially in the absence of any visible blood. Another point in favor of diverticulitis is the fact that she is 66, weighs 240 pounds, and has a perfectly normal red count and hemoglobin. On the other hand in favor of carcinoma of the colon I concede the fact that she is 66 years of age and certainly might have malignant disease. One other possibility might be considered, that is, she might have a combination of both carcinoma of the colon and diverticulitis of the colon. It has been observed in a number of cases. I do not know the exact percentage, but the combination of these two diseases is shown.

A barium enema was done and perhaps Dr Schatzki can help us.

DR SCHATZKI: There are two films here, one apparently with complete filling and one after emptying of the bowel. In the first film the barium is seen only in the rectum. I do not know the report of the examination but I think she did not expel the enema because the outside of the body looks perfectly clean and there is still a little barium in the rectum, so that I suppose there was an obstruction at the junction of the rectum and the sigmoid.

In regard to differential diagnosis between the two diseases that Dr Linton has mentioned, the x-ray would help if barium actually reached the lesion. In this case we do not know that the barium reached the lesion since there might have been spasticity distal to the

lesion, preventing the barium from reaching the lesion. There is certainly no tumor visible to explain the obstruction.

Another point that may be of interest is the fact that there is a slightly increased amount of gas in the descending colon and in the cecum, and no air whatever in the sigmoid.

DR E. L. YOUNG: Is that a trickle of barium there?

DR SCHATZKI: Yes.

DR YOUNG: That would suggest an actual narrowing of the lumen?

DR SCHATZKI: The lumen is definitely narrowed in this region.

DR YOUNG: Could spasm there do that?

DR SCHATZKI: Yes.

DR LINTON: That still leaves me with the decision to make, is this diverticulitis or carcinoma of the descending colon? I must admit I have not seen this degree of obstruction in simple diverticulitis of the colon and I think I would much rather favor the diagnosis of carcinoma of the colon with the possibility that it may be superimposed on the diverticulitis.

#### CLINICAL DISCUSSION

DR E. PARKER HAYDEN: This woman was a patient of mine in the Baker. She was very fat, weighing 240 pounds. She had complete obstruction as judged by a barium enema but I could not see any growth with the proctoscope, due to angulation of the sigmoid. No blood was seen at the end of the proctoscope. On the other hand she had a history of having passed some blood on occasions. We cleaned her out with castor oil without difficulty and operated after 3 days of preparation. The abdomen was not distended at the time of operation. There was a great deal of difficulty in the induction of anesthesia and nearly 2 hours were consumed before sufficient relaxation was achieved to permit satisfactory exposure of the tumor. When the tumor was finally seen and felt, it appeared to be entirely characteristic of carcinoma. Although originally a two stage attack had been planned, the combination of her obesity and a short mesentery of the sigmoid made a loop colostomy difficult and it seemed best—in view of our definite impression that the mass was cancer—to go ahead in one stage. An anterior resection was performed, turning in the rectal stump and making an end colostomy. For 3 days postoperatively she seemed to do well, then suddenly on the fifth day she developed severe diarrhea through her colostomy, her temperature rose to 106° and she died that night.

Of course it is obvious, in retrospect that a more conservative procedure was indicated. Had I thought it was diverticulitis, I would have done a colostomy only and not resected the mass. I did not think it was diverticulitis,

in fact it did not occur to me as being very likely I did feel that she was a poor surgical risk but that here was a tumor which had better be taken out if possible

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## "ENSOL" THERAPY

THE first article a year ago on the Ensol treatment for cancer<sup>1</sup> reported on 29 cases. In the present bulletin of the Hendry-Connell Research Foundation of Kingston, Ontario, published in August, 1936, eight of the original 29 cases are reported to be alive, a survival of 27 per cent for ten months. The statement is made, "Several of these cases seem to have returned to normal health." A clinical evaluation is offered in this bulletin based on 488 patients treated with Ensol, of whom 382 received Ensol "alone," that is, no other treatment had been given within three months of the beginning of the Ensol therapy, and 106 in whom Ensol had been used with surgery, radium and x-ray in various combinations. The diagnosis of cancer had been confirmed by biopsy in 367 out of the 488 cases, or a total of 74 per cent. Of the 382 cases that had received no treatment for three months before the beginning of Ensol therapy, 180, or 47 per cent, had died. In a large proportion of the patients, relief of pain is stated to occur

No definite statement is made as to the length of time that the patients had been followed. That it had been only a matter of a few months is apparent from the statement on page 25 of the bulletin that the survey had been completed on cases on whom treatment had been commenced prior to May 1, 1936, and that the returns had been compiled up to the end of July, 1936. It is also stated, "No recent case that has not been under treatment for at least twelve weeks has been included because it was felt that a mature judgment could not be formed as to the effects of Ensol." (The italics are ours).

Apparently the substance is not harmful as in 16,000 individual doses there had been no generalized reaction and no evidence that normal tissue had been damaged. Included in the bulletin is a study of the cultural characteristics of *Bacillus histolyticus*.

The results, as presented thus far, are inconclusive and warrant continued skepticism of the value of this proposed type of cancer therapy.

## REFERENCE

1. Canadian Medical Association Journal 33:364 1935

## CANNED FOODS

THE tin can has for years been a signpost of advancing civilization upon our frontiers, and today, when no frontiers are visible, it stands as a bulwark between the congested centers of population and the greatest fear of mass living—hunger. The opportunity which the Biblical Egyptians seized of filling their granaries in years of plenty against the years of want is transmitted to the modern housewife when she stocks her pantry shelves with canned goods against the time when supplies may temporarily fail or prices may rise. A knowledge of the preservation of food by heat sterilization, discovered by Appert in blockaded France in 1804, has driven the wolf from many a door, and for the majority of our population has helped to make the search for food something more than a hand to mouth existence.

The familiar and ubiquitous "tin can", derived from the English term "tin cannister", is actually about 98 per cent iron, being fabricated from rolled steel, covered with a thin coating of pure tin. Certain types of cans are coated with lacquer to preserve the natural flavor and color of various foods. The property of the can to preserve foods depends on heat sterilization and hermetic sealing, producing a vacuum inside the can when its contents are cooled.

Certain illusions concerning canned foods are dispelled in an interesting little booklet recently published by the American Can Company. One of these relates to the open can, in which many housewives are still unwilling to let food remain, fearing, no doubt, the deadly "pto-



maines" Actually, due to the sterilization processes to which it has been subjected, the freshly opened can is the cleanest container in the kitchen in which to leave the food which came in it. Certain acid foods, after air is admitted, may absorb traces of metal and undergo changes in flavor, but their quality is otherwise unimpaired.

From the standpoint of the vitamins it has been demonstrated that vitamins A and G are not substantially affected by the canning process, that vitamin B is relatively stable in naturally acid foods, although less well retained in the less acid ones, and that vitamin C, the most labile of all the vitamins, is well retained in commercially canned foods, although subject to destruction by open pan methods of cooking which permit free contact with atmospheric oxygen. Our daily diet is not to be relied upon for our vitamin D needs, although there is evidence that canned marine products may contribute to it.

The can of late years has been given a tremendous impetus in infant feeding, due both to the increasing use of evaporated milk and the tremendous and justified popularity of the strained and specially prepared cereals, soups and vegetables. At the other end of the line, although not mentioned even by inference, is the conveniently packaged product of the brewmaster's art.

Canned foods as an important part of the civilized diet are with us to stay, until or unless some better method of food preservation is introduced. They are no longer a by-product as in the day when the farmer was asked what he did with his corn. "We eat what we can," he replied, "and what we can't we can."

### MATERNAL MORTALITY

In the *Westchester Medical Bulletin* of September, 1936, quotations appear taken from a report by Dr. James Quigley relating to Maternal Mortality as reported in Monroe County (Rochester, N. Y.) covering the years 1933, 1934, and 1935 as found in 17,868 births.

"It can be seen that 40 deaths out of a total of 79 or approximately 50 per cent, were considered preventable. Of the 40 deaths responsibility was ascribed to the physician in 15 deaths or 37.5 per cent."

Quotation in this article from another source relating to maternal mortality is "In the report of the committee of the New York Academy of Medicine 66 per cent of the deaths were considered preventable and the responsibility was charged to the medical attendant in 61 per cent."

Further statistics on this subject are submitted by Dr. George W. Kosmak, Editor of the

*American Journal of Obstetrics and Gynecology* in a paper read before the Thirty-Second Annual Congress on Medical Education, Medical Licensure and Hospitals, February 17, 1936.

The Westchester County Medical Society is continuing its investigations of this subject and has formulated recommendations for improved methods to be used in hospitals in the management of parturient cases. Dr. Kosmak declares that "Now, it has been found that the principal causes of death in childbirth are hemorrhage, shock, sepsis and toxemia, and for this group a preventable factor must be assumed if any degree of credit is to be given to the advances made in obstetric science and art. On what should the preventability factor be based? The answer may be found in the puerperal mortality studies of recent years to which reference has been made. In practically all these, if the particular death was considered avoidable, the blame is fixed on the doctors in a large proportion of cases."

Farther on in his article, Dr. Kosmak emphasizes his conclusions and urges better training of physicians who are to practice obstetrics.

From these three sources and from unpublished expressions of opinions on many occasions there seems to be a call for action on the part of medical organizations. While it is encouraging to find that there exists a strong feeling that scientific medicine must be employed more generally in this field of practice, the question as to how to bring about the more general application of recognized preventive measures and better surgery is pertinent. May it not be necessary to inaugurate specific studies of maternal deaths more generally by organized medicine rather than to wait for a spontaneous evolution by general practitioners?

Specialists in obstetrics will of course be in the vanguard of progress and will in the future serve larger proportions of parturient patients, but why not impress on the family doctor that he must prepare himself for first-class service or refer his patients to competent practitioners?

If every maternal death were subjected to a critical review and an authorized committee discussed the facts with physicians in charge, better results might follow.

### THE COUNCIL MEETING OF THE MASSACHUSETTS MEDICAL SOCIETY

On October 7 an unusually large number of Councilors were in attendance at the Stated Meeting.

The routine business was voluminous, but was transacted promptly, so that with the earlier meeting hour there was no need of a recess for luncheon.

Two matters, of especial interest to the profession, were presented. The Committee on

Medical Education and Medical Diplomas, through its Chairman, Dr. Reginald Fitz, reported the receipt of a letter from an official of the Middlesex College School of Medicine in which the suggestion was made that the good offices of the Massachusetts Medical Society in plans for raising the standards of medical education by that institution would be appreciated. The sentiment of the meeting seemed to be friendly and cooperative.

The other matter of especial interest was presented by Dr. Tighe of Lowell. This related to the published statement in *The New England Journal of Medicine* setting forth that a Fellow of the Society had been sued for alleged conspiracy in signing papers submitted to a court recommending study of the behavior of a certain person by a State Hospital for mental illness.

The outcome of this case will be watched because, if it is found that physicians who sign commitment papers in cases of suspected mental disorders, are subject to such suits, there should be some safeguards for those who are called upon to exercise this important function.

Reference to these two matters must not be construed as adequate in dealing with this meeting, because every item of business should be carefully considered by all members and it is hoped that this brief statement will lead to careful reading of the Proceedings which will be published as soon as prepared by the Secretary, Dr. Begg.

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

BRYAN, WILLIAM A. M.D. George Washington University School of Medicine 1908. Superintendent, Worcester State Hospital. His subject is "Relationship of Psychiatry to Medicine." Page 693. Address: Worcester State Hospital, Worcester, Mass.

PERKIN, H. J. M.A. University of Toronto Research Fellow in Biochemistry, Lahey Clinic. Address: 605 Commonwealth Avenue, Boston, Mass. Associated with him is

HURTHAL, L. M. M.D. Harvard University Medical School 1923. Senior Physician Lahey Clinic. Physician, New England Baptist and New England Deaconess Hospitals. Address: 605 Commonwealth Avenue, Boston, Mass. Their subject is "The Blood Iodine Level, Before and After Subtotal Thyroidectomy for Hyperthyroidism." Page 698.

SMITH, RICHARD M. Sc.D., M.D. Harvard University Medical School 1907. Assistant Professor in Pediatrics and Child Hygiene, Har-

vard University Medical School and Harvard School of Public Health. His subject is "Acute Gastrointestinal Disease in Infants." Page 701. Address: 66 Commonwealth Avenue, Boston, Mass.

LADD, WILLIAM E. A.B., M.D. Harvard University Medical School 1906. F.A.C.S. Chief of Surgical Service, Children's Hospital Boston. Clinical Professor of Surgery, Harvard University Medical School. His subject is "Surgical Diseases of the Alimentary Tract in Infants." Page 705. Address: 300 Longwood Avenue, Boston, Mass.

CHRISTIAN, HENRY A. A.M., L.D., Sc.D. (Hon.), M.D. Johns Hopkins University School of Medicine 1900. Hersey Professor of the Theory and Practice of Physic, Harvard University Medical School. Physician-in-Chief, Peter Bent Brigham Hospital, Boston. His subject is "Diuretics and What They Do." Page 709. Address: Peter Bent Brigham Hospital, Boston, Mass.

EMERY, EDWARD S., JR. A.B., M.D. Harvard University Medical School 1920. Instructor in Medicine, Harvard University Medical School. Associate in Medicine, Peter Bent Brigham Hospital. His subject is "Progress in Gastro Enterology for 1935." Page 712. Address: 319 Longwood Avenue, Boston, Mass.

### The Massachusetts Medical Society

#### FOURTH ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning October 19

##### Barnstable

Sunday, October 25, at 4 00 p.m., at the Cape Cod Hospital, Hyannis. Subject: Blood Diseases. The Hemoglobin and Red Blood Cells in Relation to Disease. Instructor: W. B. Castle. John I. B. Vail, Chairman.

##### Berkshire

Thursday, October 22, at 4 30 p.m. at the House of Mercy Hospital, Pittsfield. Subject: Neurological Surgery. The Signs and Symptoms of the Common Brain Lesions—Organic and Traumatic. Instructor: J. S. Hodgson. Melvin H. Walker, Jr., Chairman.

##### Essex South

Tuesday, October 20, at 4 00 p.m. at the Salem Hospital, Salem. Subject: Diabetes. General Plan of Treatment in Uncomplicated Cases. Diet Insulin (Regular and Protamine). Exercise. In

structor Reginald Fitz. Walter G Phippen,  
Chairman

#### Franklin

Wednesday, October 21, at 8 00 p m., at the  
Franklin County Public Hospital, Greenfield  
Subject Cancer of the Genito Urinary Tract  
Instructor J D Barnev Halbert G Stetson,  
Chairman

#### Hampden

Thursday, October 22, at 4 00 p m., at the Acad  
emy of Medicine Professional Building, 20  
Maple Street, Springfield and at 8 30 p m in  
the Outpatient Department of the Skinner Clinic,  
Holyoke Hospital Holyoke Subject *Complica  
tions of Diabetes and Their Treatment Coma  
Insulin Reactions Surgery (Gangrene Car  
buncle etc) Marriage and Pregnancy Tuber  
culosis and Heart Disease* Instructor H F  
Root. George L Schadt and George D Hender  
son Chairmen

#### Hampshire

Wednesday October 21, at 4 15 p m, in the  
Nurses Home of the Cooley Dickinson Hospital  
Northampton Subject The Prognosis of Heart  
Disease Instructor Sylvester McGinn Robert  
B Brigham Chairman

#### Middlesex East

Tuesday, October 20 at 4 00 p m at the Melrose  
Hospital Melrose Subject Neurological Sur  
gery The Signs and Symptoms of the Common  
Brain Lesions—Organic and Traumatic. In  
structor W R Wegner Joseph H Fay Chair  
man

#### Norfolk

Friday October 23 at 8 30 p m at the Norwood  
Hospital Norwood. Subject Heart Disease  
Treatment of Cardiovascular Emergencies In  
structor B E Hamilton Hugo B C Riemer,  
Chairman.

#### Worcester (Milford Section)

Thursday October 22 at 8 30 p m in the Nurses  
Home of the Milford Hospital Milford Subject  
*Complications of Diabetes and Their Treatment  
Coma Insulin Reactions Surgery (Gangrene,  
Carbuncle etc) Marriage and Pregnancy  
Tuberculosis and Heart Disease* Instructor  
Priscilla White Joseph Ashkins Sub-Chairman

#### ESSEX SOUTH DISTRICT MEDICAL SOCIETY

##### APPLICANTS FOR EXAMINATION BY CENSORS

The following Dr Lawrence T Muttv 42 Union  
Street Manchester and Dr Thomas Francis Quinn  
548 Western Avenue Lynn have each received let  
ters approving their application for membership in  
the Massachusetts Medical Society from five doctors  
of their respective towns

R E STONE, M D Secretary

## MISCELLANY

### VOCATIONAL REHABILITATION AND WORKMEN'S COMPENSATION

There is little or no therapeutic benefit in cash  
settlements paid to injured workmen who have  
traumatic neuroses according to an investiga  
tion made recently by Carl Norcross, Ph D, of the  
Rehabilitation Division of the New York State  
Department of Education Results of the investiga  
tion have been published under the title 'Vocational  
Rehabilitation and Workmen's Compensation' and  
the report is a follow up study of 322 workmen's  
compensation cases throughout New York which  
were closed by a lump sum settlement of \$1000 or  
more

It has been generally accepted in both medical  
and workmen's compensation circles throughout the  
country says the report, that a cash award would  
help to cure a neurosis A careful investigation  
made a year or more after the settlements has  
convinced us that the value of a cash award is vastly  
overrated writes the author It is the settlement  
of the case, the actual ending of the litigation  
which is of value Whether the final compensation  
award is paid in one lump or extended through a  
number of installments makes little difference to  
the claimant's condition

The investigation disclosed that 16 per cent of  
the men had lost a large share of their compensation  
through unwise expenditures The men who had  
no losses were found to have dissipated their  
funds much more rapidly than they would have  
under an installment system Both because there  
was found to be a wastage of compensation funds,  
and because there appeared to be no therapy in the  
settlements the author has recommended that lump  
sum settlements be discontinued

Dr Norcross makes a number of recommendations  
for improving the handling of neurotic cases in the  
workmen's compensation rooms He urges that  
cases be given a more prompt and careful handling  
The average neurotic case is open in the workmen's  
compensation division for nearly three and one half  
years, it is said and much of the delay is unnecessary  
The author states that neurotic conditions grow  
as cases are delayed He also points out the  
dangerous policy of permitting claimants to read  
their own medical reports or to be present when  
physicians are testifying especially in contested cases  
where there is a difference of opinion

In New York a compensation case theoretically  
may always be reopened The report suggests that  
it is a poor policy to let neurotic claimants know  
that when their money is spent they may try  
to reopen their cases The author believes that  
one of the evils of the existing New York system in  
nonschedule cases is that claimants must be willing  
to accept a lump-sum settlement After a fair offer  
is made the neurotic claimant may procrastinate in  
definitely by refusing such a settlement. Thus  
the case is delayed and the patient's mental condition

may become worse. The remedy suggested by the report is that the referee, acting on competent medical advice, fix a fair settlement and close the case, with the award being paid in bi-weekly installments.

To overcome any prejudice the claimant may have toward the insurance company, it is suggested that the money be paid to a State administered trust fund, which already exists in New York. The carrier could close the case on its books, and the claimant could be told his case is definitely closed but that he would get all his money, regardless of his state of health. The patient would not have to remain sick to get his award.

Provision is made for permitting the claimant to get an advance on his compensation for any necessary purpose, including rehabilitating himself on a farm or in a small business.

Copies of the report may be secured through the publisher, The Rehabilitation Clinic, 28 East 21st Street New York City. Price \$1.

#### BUREAU OF HUMAN HEREDITY

The object of this Bureau is collection on as wide a scale as possible of material dealing with human Genetics. Later, the tasks of analysis of material and distribution of the information available will be added.

The Bureau is directed by a Council representing medical and scientific bodies in Great Britain. It is affiliated with the International Human Heredity Committee, which ensures co-operation in all areas where research is proceeding.

The Council would be grateful to receive all available material from institutions and individuals, furnishing well authenticated data on the transmission of human traits whatever these may be. Pedigrees are particularly desired, twin studies and statistical researches are also relevant. As research workers and others who send in material may in some cases wish to retain the sole right of publication (or copyright) those who so desire are asked to accompany their material with a statement to that effect.

Material should be given with all available details in regard to source, diagnostic symptoms and the name and address of the person or persons who vouch for accuracy. All such details will be regarded as strictly confidential.

Reprints of published work would be most acceptable. Further, many authors when publishing material may also have collected a number of pedigrees which they have been unable to reproduce in detail. It is the object of the Council that such records, by being included in the Clearing House, should not be lost.

Those wishing for a copy of the Standard International Pedigree Symbols may obtain one from the office.

Announcements in regard to the services undertaken by the Bureau will be published from time to time.

*Chairman* R. Ruggles Gates

*Executive Committee* R. A. Fisher, J. B. S. Haldane, E. A. Cockayne, J. A. Fraser Roberts, L. E. Halsey (Hon. Treasurer), C. B. S. Hodson (Hon. Gen. Secretary)

115 Gower Street, London, W.C.1, England.

#### MAINE NEWS

##### THE PRESIDENT'S PAGE\*

*To the Members of the Maine Medical Association*

According to Article II of our Constitution, 'The purposes of this Association are to promote the science and art of medicine, the protection of public health and the betterment of the medical profession.' These few phrases state concisely and definitely our whole creed. There is no need for elaboration. It only remains for us to keep these pregnant phrases ever in mind. Perhaps the first portion is the most important, for the rest, the protection of public health and the betterment of the medical profession depend very largely upon our efforts to further the science and art of medicine.

If we, as physicians, are to follow the precepts of our Constitution we must devote a certain amount of our time to the study of our profession, keeping abreast of its most progressive thought. We may do this by reading scientific journals, postgraduate study, attendance at clinics and by an active participation in our national, state and county medical meetings. All these are important, the last no less than the others. Yet, possibly because this is so readily available, it is too often neglected. If every physician would regularly attend and take part in each meeting of his county and state association, demanding by his very presence that these meetings be of sufficiently high standard to merit his interest, what a power for good would our Association become.

It is the desire of your officers this year to endeavor to carry out the purpose of the Association as set forth in Article II of our Constitution. We hope to increase the interest and the value in meetings of the constituent County Associations. Regular set dates for meetings, more frequent meetings in many cases, carefully selected and prepared programs all these should tend to a better attendance and consequently a better society. We hope to make our State Journal a state-wide medium of publication of medical material, publishing not only papers read at the annual meeting but also those presented at county meetings. If a paper is worthy of presentation before one county society it should be available through the Journal, to the whole Association. The success of this depends largely upon the county secretaries. If they will co-operate with the members

\*Reprinted from the Maine Medical Journal 27:190 1936

of the Editorial Board by turning over to them selected papers from their meetings we can make our *Journal* represent the Transactions of the County Associations as well as the State

Four years ago, President Kershner inaugurated the Fall Clinical Session. This was perhaps the outstanding achievement of one of the most brilliant administrations we have ever had. Dr. Kershner contributed a great deal to the Association but nothing of greater value than this opportunity for a short concise review of clinical problems, handled as we have to handle them ourselves. The sessions at Bangor, Portland and Lewiston fully justified Dr. Kershner's idea. It is hoped and expected that the session next month in Waterville will do likewise. It largely depends upon you men. A well prepared program will be presented. A good attendance is all that is necessary to make the session a success. Come and see how your confrere, situated as you are handles his problems. Discuss it freely, criticize if you will, approve if you feel so disposed but come and take an active part. Both you and your confrere will benefit by it. It is just one more way to help make our Association stronger and to further promote the science and art of medicine. And it doesn't do us a bit of harm to get together once in a while to socialize a little, as only doctors can at the close of a day's meeting.

FREDERICK T. HILL, M.D.

On Sept. 13, 1936 a meeting of the Editorial Board of the *Maine Medical Journal* was held at the Penobscot Valley Country Club. Owing to the recent resignation of Dr. E. W. Gehring of Portland as Editor in Chief, a change in the management of the *Journal* was voted upon. It was voted that the *Journal* should be run by active participation of the entire Editorial Board with Dr. Frank H. Jackson, of Houlton as Acting Chairman.

It was voted that the policy of the *Journal* should be one in which the aim should be to publish purely State of Maine material, with the exception of those papers read before the Maine Medical Association's annual meeting or before county medical societies. The effort was to be made to encourage the writing of papers for the county medical societies especially by the younger men.

The annual meeting of the Piscataquis County Medical Society was held Sept. 17, 1936, at the Piscataquis Valley Country Club. Dr. Edward H. Risley of Waterville read a paper on "The Treatment of Certain Postoperative Complications," and Dr. F. T. Hill, President of the Maine Medical Association outlined briefly a few of the problems of the Association for the coming year. He spoke of the re-organization of the *Journal* and the desire to induce more men to contribute scientific papers to

the *Journal*. He also emphasized the importance of the county medical society as the strongest factor in building a strong state society and urged more frequent stated meetings of the county societies with programs planned at least two months before the time of meeting.

## CORRESPONDENCE

### THE HUMOR OF DR. OLIVER WENDELL HOLMES

Editor *New England Journal of Medicine*,

Apropos of the address of Dr. Robert V. Green on Dr. Oliver Wendell Holmes published in your issue of September 10 the following anecdote never before published, may be of interest to your readers.

When Holmes was professor in Harvard Medical School, there was among his students a young man named L. W. Clapp afterward a very skillful physician in Pawtucket, Rhode Island.

Dr. Clapp died many years ago but the incident I am relating was told me by him so there is no doubt of its truth.

Clapp and another medical student were going to Holmes' lecture room one winter day to attend the lecture. They went afoot and their path led at one place over a vacant lot which was being filled in, to bring it up to a level with surrounding land. As they were passing through this lot, Clapp's companion noticed a couple of turkey legs among the earth dumped on the lot. The name of this companion I do not remember but Dr. Clapp called him Jack.

To the astonishment of Clapp, Jack picked up the turkey legs, wiped them carefully and put them in his pocket.

"What in the world are you going to do with turkey legs?" asked Clapp. Jack replied laconically "Wait and see."

The class assembled as usual in the lecture room and Dr. Holmes began his lecture. He had proceeded about five minutes when to his amazement an object hurtled through the air and landed on his desk. It was a turkey leg. Dr. Holmes paused a moment and when the merriment subsided resumed his lecture.

A few minutes later another turkey leg flew over the heads of the students in front and almost hit the professor. This time he again waited until the room was quiet and then with the well known twinkle in his eyes recited this quotation from Young's "Night Thoughts" —

"Insatiate Archer, would not one suffice?"

A more felicitous response can scarcely be imagined and needless to say the class fully appreciated the brilliancy of the quotation.

Respectfully yours

JAMES L. JENKS

255 Main Street, Pawtucket, R. I.  
September 25, 1936

## ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

535 North Dearborn Street, Chicago, Illinois,  
September 28, 1936

Managing Editor,  
*New England Journal of Medicine,*

In addition to the articles enumerated in our letter of September 1 the following have been accepted

## International Vitamin Corporation

IVC Halibut Liver Oil Plain

Capsules IVC Halibut Liver Oil, Plain,  
3 minims

IVC Halibut Liver Oil Fortified with Natural  
Vitamin D

Capsules IVC Halibut Liver Oil with  
Vitamin D Concentrate in Neutral Oil,  
3 minims

## Lederle Laboratories, Inc

Pollen Antigen Lederle, Mixed Grasses

Concentrated Pollen Antigen Lederle Mixed  
Grasses

Scarlet Fever Streptococcus Immunizing Toxin  
Lederle, one 2 cc vial containing 80,000  
to 100,000 skin test doses

## United States Standard Products Co

Ampuls Solution Caffeine Sodio Benzoate  $7\frac{1}{2}$   
grains, 2 cc

The following products have been accepted for inclusion in the List of Articles and Brands Accepted by the Council But Not Described in NNR (New and Nonofficial Remedies 1936, p 471)

## Lederle Laboratories, Inc

Glycerinated Allergenic Extracts (Diagnostic)

Lederle (Bee, House Fly, Mosquito and  
Sand Fly)

Yours sincerely,

PAUL NICHOLAS LEECH *Secretary,*

Council on Pharmacy and Chemistry

## RECENT DEATH

**BARRY**—EMMETT WILLIAM BARRY, M.D. of Whitinsville Massachusetts died October 6 1936 after a short illness

Dr Barry was born in 1871. He graduated from the College of Physicians and Surgeons of Baltimore in 1897. He practiced for a year in Uxbridge and then moved to Whitinsville where he practiced up to the time of his death.

Dr Barry was a member of the Knights of Columbus, the Hibernians and the United Woodmen. He was a Fellow of the Massachusetts Medical Society. A widow, a son, a daughter, and two brothers survive him.

## NOTICES

## MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p m on Thursday, October 22 in the Amphitheatre of the Peter Bent Brigham Hospital, Dr Soma Weiss, Associate Professor of Medicine, Harvard Medical School, and Director 2nd and 4th Medical Services (Harvard) Boston City Hospital, will give a medical clinic. To it are cordially invited practitioners and medical students.

## UNITED STATES CIVIL SERVICE EXAMINATIONS

PRINCIPAL INDUSTRIAL TOXICOLOGIST  
(HEAVY METALS), \$5,600 A YEAR

## TREASURY DEPARTMENT, PUBLIC HEALTH SERVICE

Applications must be on file with the United States Civil Service Commission at Washington D C, not later than November 2, 1936.

The United States Civil Service Commission announces an open competitive examination for the position named above. Vacancies in this position in Washington D C and in the field and in positions requiring similar qualifications will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion. The salary named above is subject to a deduction of  $3\frac{1}{2}$  per cent toward a retirement annuity.

Duties—To inaugurate, plan, and direct investigations upon the toxicology of heavy metals, and to furnish for executive action expert or critical advice upon the industrial toxicology of heavy metals.

Basis of Ratings — Competitors will not be required to report for examination at any place but will be rated on their education and experience on a scale of 100, such ratings being based upon competitors' sworn statements in their applications and upon corroborative evidence.

## SENIOR MEDICAL TECHNICIAN (BONE PATHOLOGY), \$2,000 A YEAR, CHILDREN'S BUREAU, DEPARTMENT OF LABOR

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A vacancy exists in the Children's Bureau Department of Labor Baltimore Md.

Duties—To study the histologic and pathologic aspects of bones to prepare or supervise the prepara-

tion of sections of bones to describe the microscopic findings, and to analyze and evaluate the results

#### THE APPOINTMENT OF DR SAMUEL J BECK

Dr Samuel J Beck has been appointed in charge of the Psychology Laboratory in the Department of Psychiatry at the Michael Reese Hospital Dr Beck was formerly with the Department of Psychiatry of the Harvard Medical School and the Psychopathic Hospital, Boston, Mass., where he was a research associate

Dr Beck holds a Ph D degree from Columbia University and has been a Rockefeller Fellow in Psychiatry studying abroad. He is the associate editor of the *American Journal of Orthopsychiatry*

#### ANNOUNCEMENTS

EDWIN B SEELYE, M D, announces the opening of an office associated with WALTER C SEELYE M D., in the Slater Building 390 Main Street, Worcester, Massachusetts Room 447

FRANKLIN E CAMPBELL, JR, M D, announces his transfer from the U S Marine Hospital Chelsea Mass to the U S Marine Hospital Seattle Washington

MARCUS W BERMAN, M D, announces the opening of an office at 304 Belgrade Avenue, West Roxbury, Mass

#### REPORTS AND NOTICES OF MEETINGS

##### FAULKNER HOSPITAL CLINICAL MEETING

The usual monthly clinical meeting was held at the Faulkner Hospital on Thursday afternoon October 1, at 5 00 p m Among the interesting cases that had come to autopsy during the summer months, two were selected for discussion

One was the case of a woman 55 years of age who entered the hospital with the complaint of severe headaches mental confusion and periods of semi consciousness, from which however she could be aroused A cerebral tumor or some vascular accident in the brain were the two most likely diagnoses Some pathology within the central nervous system was supported by the presence of increased cells in the spinal fluid and a xanthochromic spinal fluid Finally by ventriculogram a tumor was located in the right posterior temporal occipital region and this diagnosis was confirmed at operation, at which an inoperable tumor was found that at autopsy proved to be a glioma One of the interesting points in this case was the fact that just a month before the onset of the symptoms definitely pointing toward the brain this patient had been operated

on for typical symptoms of hyperthyroidism, and was relieved of all of her symptoms so that she felt herself well on leaving the hospital, about two weeks before the severe headaches developed. The symptoms of hyperthyroidism did not begin until January, 1936 At the time of the development of these symptoms there was an occasional headache and some tremor of the feet It is interesting to speculate if there could be any relation between this glioma of the brain and the typical picture of hyperthyroidism

The other case presented was that of a man 22 years of age, who had had rheumatic fever ten years before at which time it was noted that a valvular disease of the heart had developed Only 5 weeks before death did symptoms arise and these consisted in feeling poorly and feverish The fact that he was running a fever was established only 3½ weeks before his death He ran a continued fever There was some looseness of the bowels There was aching in the knees and calves of the legs and a loss in weight of about 10 pounds On physical examination there were numerous petechial spots. There were evidences of chronic cardiac valvular disease consisting in a presystolic thrill and a presystolic murmur with a snapping first sound at the apex and a systolic murmur heard all over the precordium The electrocardiogram showed no evidence of myocardial involvement The clinical pathology showed some albumin and casts in the urine a leukocytosis of 22 000 with 80 per cent of polynuclear cells and a steadily increasing diminution in red count starting at 4 500 000 two weeks before death and dropping to 3 350 000 a few days later A blood culture showed a positive growth which was reported as *Streptococcus viridans* During the last few days of life, he developed a panophthalmitis in one eye and signs of meningeal irritation which were thought to be due to invasion of the meninges with bacteria or to numerous embolic phenomena in the meninges It was thought to be a typical case of *Streptococcus viridans* septicemia with involvement of the diseased cardiac valves, but it was considered peculiar in view of the short duration of its course At autopsy a chronically diseased mitral valve was found with vegetations upon it. Also embolic areas, some developing into abscesses were found at the cortex of the brain extending to the meninges The kidneys showed embolic phenomena with beginning abscess formation There were some beginning abscesses in the lungs Cultures however from the heart's blood vegetations on the valves and the involved eye all showed an organism which turned out to be a pneumococcus, Type V and it was felt without doubt that this was the cause of the disease and that undoubtedly the organism which had been reported as a *Streptococcus viridans* was this pneumococcus which had perhaps been modified somewhat in its character as it circulated through the blood stream.

Following the presentation of these two cases Dr Burton E Hamilton discussed The Treatment of

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3 minims

IVC Halibut Liver Oil Fortified with Natural  
Vitamin D

Capsules IVC Halibut Liver Oil with  
Vitamin D Concentrate in Neutral Oil,  
3 minims

Lederle Laboratories, Inc

Pollen Antigen Lederle Mixed Grasses

Concentrated Pollen Antigen Lederle Mixed  
Grasses

Scarlet Fever Streptococcus Immunizing Toxin  
Lederle one 2 cc vial containing 80,000  
to 100,000 skin test doses

United States Standard Products Co

Ampuls Solution Caffeine Sodio-Benzozate  $7\frac{1}{2}$   
grains, 2 cc

The following products have been accepted for inclusion in the List of Articles and Brands Accepted by the Council But Not Described in NNR (New and Nonofficial Remedies, 1936, p 471)

Lederle Laboratories, Inc

Glycerinated Allergenic Extracts (Diagnostic)

Lederle (Bee, House Fly, Mosquito and  
Sand Fly)

Yours sincerely

PAUL NICHOLAS LEECH, *Secretary*,  
Council on Pharmacy and Chemistry

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## NOTICES

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SENIOR MEDICAL TECHNICIAN (BONE PATHOLOGY) \$2,000 A YEAR, CHILDREN'S BUREAU DEPARTMENT OF LABOR

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A vacancy exists in the Children's Bureau Department of Labor Baltimore Md

Duties—To study the histologic and pathologic aspects of bones to prepare or supervise the prepara-



## NORFOLK DISTRICT MEDICAL SOCIETY

A stated meeting of the Society will be held in St. Elizabeth's Hospital, Brighton, October 27, 1936, at 8 00 p m Tel Sta 7000

Business 8 00 p m

Communications 8 15 p m

- 1 Indication for Spinal Fusion—Dr Thomas F Broderick
- 2 Recent Advances in the Treatment of Pruritus Vulvae—Dr Charles J Kickham
- 3 Medical Aspects of Gallbladder Disease—Dr John J Whoriskey
- 4 Surgical Aspects of Gallbladder Disease—Dr Joseph Stanton.
- 5 Radiological Aspects of Yeast Infection of the Lungs—Dr Thomas R Healy
- 6 The Treatment of Pneumonia—Dr John F Casey

Twelve minutes will be allotted to each speaker Discussion will be postponed until after all communications have been completed

FRANK S CRUICKSHANK, M D, *Secretary*  
1247 Beacon Street Brookline

*Postgraduate Extension Courses* These lectures will begin on October 16 and will continue through November 20 They will be given in the Norwood Hospital on stated Fridays at 8 30 p m Full particulars may be obtained from the District Chairman Dr Hugo B C Riemer, 128 Newbury Street, Boston Tel Kenmore 2826

## HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheatre (Shattuck Street Entrance), Tuesday evening October 27, at 8 15 p m

### PROGRAM

#### Presentation of Cases

Cases of Attempted Suicide in a General Hospital By Merrill Moore M D, Associate in Psychiatry, Harvard Medical School

Medical students and physicians are cordially invited to attend

MARSHALL N FULTON, M D, *Secretary*

## WORCESTER NORTH DISTRICT MEDICAL SOCIETY

The Worcester North District Medical Society will hold a regular quarterly meeting at the state colony in Gardner at 4 30 p m Wednesday, October 28 The speaker will be Dr Harvard H Crabtree of Boston

## SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK  
BEGINNING MONDAY, OCTOBER 19, 1936

Tuesday October 20—

All day meeting Academy of Physical Medicine  
Hotel Statler Boston

- \*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Treatment of Gastro-Intestinal Disorders in Infants Dr Francis McDonald
- 9 30 a m Massachusetts General Hospital Thoracic Clinic Ether Dome
- 11 30 a m Massachusetts General Hospital Eye Nerve Conference Out-Patient Department
- \*12 m South End Medical Club Headquarters of the Boston Tuberculosis Association 554 Columbus Avenue Boston
- 12 m Boston Dispensary Luncheon meeting of the Clinical Staff.

Wednesday, October 21—

- All-day meeting Academy of Physical Medicine Hotel Statler Boston
- 8 a m Massachusetts General Hospital Orthopedic Rounds
- \*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Hospital Case Presentation Dr S J Thannhauser
- \*12 m Clinico-Pathological Conference Children's Hospital Amphitheatre.

Thursday October 22—

- All-day meeting Academy of Physical Medicine Hotel Statler, Boston
- 9 a m Massachusetts General Hospital Surgical Grand Rounds Amphitheatre
- \*9 a m - 10 a m Boston Dispensary, 25 Bennet Street Social Service Case Presentation Miss E C Canterbury
- 9 15 a m Massachusetts General Hospital Neurological Conference Ether Dome
- 11 a m Massachusetts General Hospital Medical Grand Rounds Ether Dome
- 12 m Massachusetts General Hospital Clinico-Pathological Conference
- \*3 30 p m Medical Clinic, Peter Bent Brigham Hospital
- 5 15 p m Massachusetts Medical Benevolent Society Boston Medical Library 8 Fenway

Friday, October 23—

- \*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Recent Work in Epilepsy and Migraine Dr William G Lennox
- 10 30 a m. Massachusetts General Hospital Fracture Rounds
- 12 m Massachusetts General Hospital Urological Conference Out-Patient Department.

Saturday, October 24—

- \*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Hospital Case Presentation Dr S J Thannhauser
- \*10 a m - 12 m Staff Rounds at the Peter Bent Brigham Hospital Conducted by Dr Henry A Christian

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

October 16—The Celebration of the Use of Ether Massachusetts General Hospital See page 689 Issue of October 8

October 18—Special Service for Physicians and Medical Students See page 691 Issue of October 8

October 19 23—Clinical Congress of the American College of Surgeons, Philadelphia

October 19 31—1936 Graduate Fortnight of the New York Academy of Medicine See page 1221 Issue of June 11

October 20—South End Medical Club See page 692 Issue of October 8

October 20 22—Academy of Physical Medicine Annual Meeting Hotel Statler Boston See page 692 Issue of October 8

October 20 23—The American Public Health Association See page 1226 Issue of June 11

October 22—Massachusetts Medical Benevolent Society Annual Meeting See page 691 Issue of October 8

October 22—Medical Clinic at the Peter Bent Brigham Hospital. See page 738

October 27—Harvard Medical Society See notice elsewhere on this page

November 12—Pentucket Association of Physicians Hotel Bartlett, 95 Main Street Haverhill at 8 30 p m

November 16—One hundredth anniversary of the founding of the Army Medical Library 7th Street and Independence Avenue S W Washington D C

December 3 5—Annual Conference of the National Society for the Prevention of Blindness Columbus Ohio

Bacterial Endocarditis", including streptococcus, pneumococcus and other types. He called attention to the importance of being absolutely sure of the type of organism before reporting cures of a specific type of infection, using the case just reported to illustrate how, had it not been for the bacteriologic studies at the postmortem examination, the case would have been erroneously recorded as one of *Streptococcus viridans* infection.

Apparently bacterial endocarditis is on the increase according to the statistics. Available figures suggest that 5 per cent of all cases of rheumatic fever with involvement of the valves of the heart die with bacterial endocarditis.

Dr Hamilton brought out the point which is still under discussion whether the *Streptococcus viridans* is the cause of rheumatic fever. If so, the eventual invasion of the blood stream with this organism, and its location upon the diseased valves of old rheumatic fever may be a condition similar to the development of miliary tuberculosis originating from some long-continued focus of tuberculous infection. He raised the question of whether bacterial endocarditis can develop upon healthy valves and, instead of continuing on to a fatal termination, heal up. There is some evidence to support this idea. Usually with bacterial endocarditis the myocardium is not involved although in rheumatic fever it usually is. He mentioned the interesting case of a bacterial growth developing upon the site of an arteriovenous aneurysm which resulted in cure by the excision of the diseased area.

In regard to treatment the bactericidal substances which have been suggested were dismissed without comment on the ground that any substance strong enough to kill off these bacteria would be detrimental to the host.

It was brought out in the discussion that hyperpyrexia is not of value in these conditions because the organisms are resistant to higher temperature than the body can stand. He considered that attempts to develop an immune sera for streptococcus infections and pneumococcus infections would probably be of no value because the organisms are already existing in the circulation and presumably have produced as much reaction as possible and do not succeed in causing appreciable trouble until they find a haven in which they can grow, apparently protected from the antibodies in the blood stream. Therefore, little can be hoped for by introducing more antibodies, in view of the fact that these organisms have developed in a position where they are apparently protected from the serum. In cases of meningococcus and gonococcus endocarditis, the value of antisera must be kept in mind, because favorable results have been reported, but the likelihood of real benefit by this treatment is small.

He called attention to the instances of animals in which antipneumococcus serum has been developed dying of pneumococcus septicemia. He brought up the question of the relation between oral sepsis

due to *Streptococcus viridans* and the development of bacterial endocarditis from this source. The evidence suggests that there may be such a relation, and therefore, as a prophylactic procedure, these organisms should be eliminated from lesions about the teeth.

In summary he felt that attempts at specific treatment against bacterial endocarditis should not, because of the disturbance and expense associated therewith, be undertaken with the hope of real benefit unless circumstances made experimental study seem justifiable.

## SUFFOLK DISTRICT MEDICAL SOCIETY

### CENSORS MEETING

The Censors of the Suffolk District Medical Society will meet for the examination of candidates at the Medical Library, No 8 Fenway, Thursday, November 5, 1936, at 4 00 o'clock.

Candidates should make personal application to the Secretary, and present their medical diplomas at least one week before the examination.

CHARLES C LUND M.D., Secretary

319 Longwood Avenue, Boston

### 1936-1937 SCHEDULE

October 28, 1936—Stated Meeting Boston Medical Library 8 15 p m

Report on a Study of Maternal Mortality in Boston Made by the Obstetrical Society of Boston and the Boston City Department of Health." Dr Robert L DeNormandie

Discussion Dr Charles F Wilmsky and Dr John T Williams

(Final notice of this meeting No postcards will be sent out.)

November 18, 1936 — Boston Medical Library 8 15 p m

'Hydrocarbons and Cancer Dr M J Shear—USPH Service

"Cancer Research Recent Advances in Our Knowledge of Cancer Dr J C Aub

Discussion Dr J W Schereschewsky—USPH Service and Dr R. B Greenough

January 27, 1937 — Boston Medical Library 8 15 p m Joint Meeting with the Boston Medical Library

'Anthropology Dr Carleton S Coon

March 31 1937—Boston Medical Library 8 15 p m Social Insurance—It Affects the Medical Profession' Dr Charles E Mongan

Discussion Dr Channing Frothingham

April 28 1937 — Annual Meeting Boston Medical Library 8 15 p m

Problems in Surgical Diagnosis Dr Howard M Clute

CONRAD WESSELHOEFT, M.D. President,  
CHARLES C LUND M.D., Secretary

# The New England Journal of Medicine

VOLUME 215

OCTOBER 22, 1936

NUMBER 17

## The Massachusetts Medical Society

### SECTION OF SURGERY

Municipal Auditorium, Springfield, Tuesday, June 9, 1936

#### PRESIDING

Dr E Parker Hayden, Boston, Chairman.

Dr Frederick S Hopkins, Springfield Secretary

CHAIRMAN HAYDEN    Gentlemen—The first paper

is to be given by Dr William E Browne on "The Necessity for Use of Splints at Certain Stages in the Treatment of Infections of the Hand with a Demonstration of Some of the Newer Types"

### THE NECESSITY FOR USE OF SPLINTS AT CERTAIN STAGES IN THE TREATMENT OF INFECTIONS OF THE HAND, WITH A DEMONSTRATION OF SOME OF THE NEWER TYPES\*

BY WILLIAM E. BROWNE, M D †

I AM grateful for the time which has been allotted to me this morning to review certain well-known, and perhaps at times somewhat forgotten, facts which are highly important in the treatment of infections of the hand. The benefits obtainable by the use of various forms of splints, and certain splints designed within the past year, will be presented for your consideration.

When one considers the anatomy of the hand the numerous spaces in which infection may occur the various pathways through which infections spreads, scar tissue formation which develops after infection in muscles, tendons and ligaments, one is at times surprised that we do not have a greater percentage of crippling deformities in the hand, after infection, than we do at the present time.

In order to understand the reasons for the use of various mechanical devices and splints of one kind or another, it is necessary to know in a general way, the functions of the muscles and tendons in the hand. Without being too technical, it is perhaps correct to say that, excluding the thumb, the main functions of the other fingers of the hand are flexion and extension of ginglymoid joints. It is at once obvious, however, that the combined motions permissible in the metacarpophalangeal articulations, amounting practically to circumduction, are more than the action obtainable in a hinge-joint. One is not greatly in error, however, when one says that the ability to close the fingers, so that the tips of the fingers normally

come in contact with the palm of the hand, and the ability to extend the fingers in nearly a straight line, comprise the chief motions of the fingers. The thumb is perhaps the most important part of the hand. It aids each finger in its own individual action, and aids all of the fingers working together.

Dr Allen B Kanavel has twice been good enough within the past few years, to come to our clinic at the Carney Hospital and speak upon some phases of disease and injury, as they affect the human hand. His excellent work on infections of the hand should be among the books of every physician who is called upon to treat injuries and infections of this very important anatomic structure. When in Chicago, one would do well to visit the Passavant Hospital and observe the work done by Dr Kanavel's associates, Drs Sumner Koch and Michael Mason. Their work in the operating room is most instructive, but not more so than the highly important postoperative care, the dressings carefully applied, splints ingeniously used, and motions based on physiologic principles carried out.

On each occasion when Dr Kanavel visited our hospital, he stressed the functional activities of the hand. He considered the hand, first in its normal resting position, and then showed the reasons why infections diminish, or at times entirely prevent, the actions of various parts of the hand, or the hand as a whole. Obviously, it is necessary, for one attempting anything more than so-called ordinary surgical procedures in the hand, to have a detailed knowledge of the structures which enter into its formation. A knowledge of the layers of the skin, for example, is important in considering various types of skin

Read at the Annual Meeting of the Massachusetts Medical Society Section of Surgery Springfield, June 9 1936

†Browne, William E—Surgeon in Chief, Second Surgical Service Carney Hospital For record and address of author see This Week's Issue, page 790

March 30 - April 2, 1937—First International Conference on Fever Therapy Postponement notice See page 52, issue of July 2

April 21-24, 1937—American Society for Experimental Pathology See page 1075, issue of May 21

## DISTRICT MEDICAL SOCIETIES

### FRANKLIN DISTRICT MEDICAL SOCIETY

Will meet at the Weldon in Greenfield at 11 a. m. the second Tuesdays of November, January, March and May

Sunderland CHARLES MOLINE M.D., Secretary

### HAMPDEN DISTRICT MEDICAL SOCIETY

October 20—Regular Fall Meeting at the Springfield Academy of Medicine 20 Maple Street Springfield, at 4 15 p m

### MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

November 18—Bear Hill Golf Club, Stonham  
January 13, 1937—Bear Hill Golf Club Stoneham  
March 16, 1937—Danvers State Hospital, Danvers  
May 11, 1937—Bear Hill Golf Club Stonham

KENNETH L. MACLACHLAN M.D. Secretary  
1 Bellevue Avenue Melrose

### NORFOLK DISTRICT MEDICAL SOCIETY

October 27—See page 741

November 24—8 15 p m The Beth Israel Hospital Communications and Case Presentations by the Staff Principal subject—Cardiology Details of program to be announced

January 19, 1937—8 15 p m The Peter Bent Brigham Hospital Communications and Case Presentations by the Staff Suggested title—'Abdominal Pain from the Medical and Surgical Standpoint' Details of program to be announced

February 23, 1937—Time place and details of program to be announced

March 30, 1937—8 15 p m New England Deaconess Hospital A Symposium on Diabetes entitled A Survey of the Diabetic Work of the George F. Baker Clinic in the New England Deaconess Hospital Communications and Case Presentations by the Staff Drs. Elliott P. Joslin Howard F. Root, Priscilla White Alexander Marble and Allen P. Joslin

May, 1937—Annual Meeting Details to be announced

The Secretary on behalf of the Society and its Executive Committee desires to express appreciation to the Physicians, Surgeons, Hospital Executives and others who have so kindly consented to assist us in connection with the above program

Note The Censors will meet for the examination of candidates on the first Thursday of November 1936 and May 1937 Fee of \$10.00 is payable at the time of examination Application blanks may be obtained by writing the Secretary furnishing name address and name of school of graduation in medicine Application must be made at least three weeks prior to date of examination Candidates whose applications are on file will receive proper notices

FRANK S. CRUICKSHANK M.D. Secretary  
1247 Beacon Street Brookline

### PLYMOUTH DISTRICT MEDICAL SOCIETY

October 15—11 a m at the Moore Hospital Brockton  
FRED F. WEINER M.D. Secretary  
231 Main Street Brockton

### SUFFOLK DISTRICT MEDICAL SOCIETY

October 28 April 28, 1937—See page 740  
November 5—Censors Meeting See page 740

### WORCESTER DISTRICT MEDICAL SOCIETY

November 5—At 4 30 in the rooms of the Worcester Medical Library, Inc. at 34 Elm Street Worcester will be held the fall Censors meeting

November 11—Grafton State Hospital North Grafton Mass 6 15 p m Dinner—complimentary by the hospital 7 30 p m Business session and scientific program

December 9—St. Vincent Hospital Worcester Mass 6 15 p m Dinner—complimentary by the hospital 7 30 p m Business session and scientific program

January 13, 1937—Worcester City Hospital Worcester Mass 6 15 p m Dinner—complimentary by the hospital 7 30 p m Business session and scientific program

February 10, 1937—Worcester State Hospital Worcester Mass 6 15 p m Dinner—complimentary by the hospital 7 30 p m Business session and scientific program

March 10, 1937—The Memorial Hospital, Worcester Mass 6 15 p m Dinner—complimentary by the hospital 7 30 p m Business session and scientific program

April 14, 1937—Worcester Hahnemann Hospital Worcester Mass 6 15 p m Dinner—complimentary by the hospital 7 30 p m Business session and scientific program

May 6, 1937—At 4 30 in the rooms of the Worcester Medical Library, Inc. at 34 Elm Street, Worcester will be held the spring meeting of the Board of Censors

Wednesday Afternoon and Evening, May 12, 1937—Annual Meeting Time and place for this meeting will be announced in an early spring issue of the Journal.

ERWIN C. MILLER M.D., Secretary  
27 Elm Street, Worcester

### WORCESTER NORTH DISTRICT MEDICAL SOCIETY

October 28—See page 741

## BOOKS RECEIVED FOR REVIEW

Diseases of the Nails V. Pardo-Castello 177 pp  
Springfield and Baltimore Charles C. Thomas \$3.50

Digestion and Health Walter B. Cannon. 160 pp  
New York W. W. Norton & Company, Inc. \$2.00

Research in Dementia Praecox [sic] Nolan D. C. Lewis 320 pp  
New York The National Committee for Mental Hygiene \$1.50

The Riddle of Woman A Study in the Social Psychology of Sex Joseph Tenenbaum 477 pp  
New York Lee Furman, Inc. \$3.50

The Clinical Use of Digitalis. Drew Luten 226 pp  
Springfield and Baltimore Charles C. Thomas \$3.50

Röntgen Interpretation A Manual for Students and Practitioners George W. Holmes and Howard E. Ruggles Fifth Edition, Thoroughly Revised 356 pp  
Philadelphia Lea & Febiger \$5.00

A Textbook of Obstetrics Edward A. Schumann. 780 pp  
Philadelphia and London W. B. Saunders Company \$6.50

Oral Diagnosis and Treatment Planning A Text for the Dental Student a Reference Book for the Practitioner and Medical Student Kurt H. Thoma. 379 pp  
Philadelphia and London W. B. Saunders Company \$6.00

A Text Book of Pharmacology and Therapeutics of the Action of Drugs in Health and Disease Arthur R. Cushny Eleventh Edition Thoroughly Revised by C. W. Edmunds and J. A. Gunn 808 pp  
Philadelphia Lea & Febiger \$6.50

Starling's Principles of Human Physiology Edited and Revised by C. Lovatt Evans The chapters on the central nervous system and sense organs revised by H. Hartridge Seventh Edition 1096 pp  
Philadelphia Lea & Febiger \$8.75

Live Long and Be Happy How to Prolong Your Life and Enjoy It. Lewellys F. Barker 224 pp  
New York and London D. Appleton Century Company \$2.00

Anatomy of the Human Body Henry Gray Twelfth Edition Thoroughly Revised and Re-Edited by Warren H. Lewis 1381 pp  
Philadelphia Lea & Febiger \$10.00

structures of the hand. It is not difficult, however, to bear in mind certain points with reference to the anatomy of the hand, which must not be forgotten. On the palmar surface of each finger are two crease marks. These creases in the skin are the surface markings of unprotected tendon sheaths below. Injuries to the fingers close to these crease marks, with or without ensuing infection, not infrequently cause serious trouble. An injury on the palmar surface of a finger, or the palmar surface of any part of the hand, that results in infection is much more likely to cause serious trouble than lesions on the dorsal aspect of the hand.

It is necessary to bear in mind the closed spaces within the hand. There are several

sion or hyperextension of an infected thumb, which results in pain in the little finger or hypothenar eminence, not infrequently indicates that the infection has gone from the thumb side of the hand through into the closed space on the little finger side of the hand, which closed space extends out well on to the palm. One other closed space should be mentioned, and that is the one in relation to the flexor carpi radialis tendon.

It is difficult to recall the poor results that I have had in the past years, and not to mention even in this short paper, some of the causes of those poor results, and methods used to prevent them. If time permitted it might be helpful to say a word, in conjunction with the use of splints, to describe incisions used for the



SPLINT NO 1

Simple splint with cock up attachment at wrist

- A Forearm attachment.
- B Hand attachment
- C Thumbscrew
- D Little pivots for attaching straps

such spaces, the details of which are quite difficult to remember, but an everyday practical knowledge of these spaces is not difficult of attainment. Briefly, the index, middle and ring fingers have closed spaces in which infections often occur, and these spaces, in a general way extend from about the middle of the distal phalangeal area to the metacarpophalangeal area. There is a fairly large closed space connected with the thumb and thenar eminence, which, practically speaking, extends from the middle of the terminal phalanx of the thumb down the palmar surface of the thumb, over a good part of the thenar eminence and terminates in the region of the anterior carpal canal. Similarly, on the little finger side of the hand, the largest closed space is found and this extends from nearly the tip of the little finger down to the anterior carpal region. Most often these two last-named spaces are separate but, at times under normal conditions one space may communicate with the other. Very often infections in the thumb result in a spreading of infection to the closed space on the ulnar side of the hand. Exten-

drainage of a lumbrical abscess so placed that they do not injure digital vessels and nerves. A word might be said on the elevation of a V-shaped flap on the palmar surface of the hand with excision of a small portion of the deep palmar fascia, by which infections in the thenar and ulnar spaces may be drained. Excision of a small portion of deep palmar fascia tends to prevent contractures in the deep palmar fascia, which cause restriction of motion. Before demonstrating the splints used after drainage of infection has been established, one rule must be briefly mentioned in connection with incisions for drainage purposes, and that is, incisions must be made through a bloodless field. In other words a tourniquet of some kind must be used and anesthesia is best obtained by any method other than introduction of a fluid with the use of a needle. A piece of rubber tubing for a tourniquet should be replaced by the ordinary blood pressure cuff. This precaution tends to prevent the occurrence of tourniquet paralysis and the use of a general anesthetic unless con-

graft which are used so much today in the treatment of contractures. The three main nerves must be clearly understood, and one must, from long time spent in the anatomy laboratory, have a clear mental picture of the surface markings and terminal pathways of the median, ulnar, and musculospiral nerves. Certain very important points must be borne in mind, with reference to these nerves, by anyone who is called upon to treat an ordinary laceration of the hand or wrist.

In the ordinary course of general practice, one sees various injuries, and should have certain dependable methods by which an examination may show what, if any, important structures of the hand have been injured. When, for example, the porcelain handle on a water faucet breaks and cuts the hand, not infrequently the median nerve supply to the flexors of the thumb, and one or both flexors, may be divided. Just beneath the palmaris longus tendon, when it is present, lies the median nerve, seldom much over one quarter inch beneath the surface of the skin, at the wrist. The ulnar nerve is the most important nerve supply to movable soft parts of the hand. The most important branch of the ulnar nerve, as it crosses the anterior annular ligament, is very close to the surface of the base of the hand, and seldom if ever farther away than one-quarter inch from the skin surface close to the styloid process of the ulna, or the pisiform bone. Before considering any form of splint on which the hand may rest comfortably, one should first of all be sure whether there has been interruption in the continuity of these nerves as the result of accident, or from other causes.

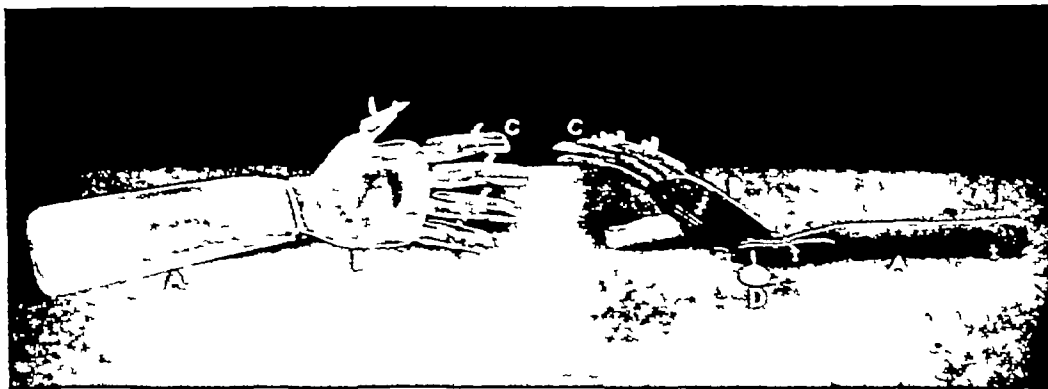
If one is able to separate the fingers, and to adduct the fingers, and if the patient can adduct the thumb so that the tip of the thumb touches the palmar surface of each metacarpophalangeal joint, then the ulnar nerve, in all probability, has not been injured. If the patient touches the tip of the thumb to the tip of each finger, and if the lumbrical muscles of the index and mid fingers function normally, then the median nerve has probably not been injured. If sensory reactions on the dorsal aspects of the first and second segments of the hand, or the thumb and index finger, are normal, then in all probability a wound near the wrist has not interfered with the radial nerve. These rules are very simple indeed and must be remembered in an examination of the hand.

Most physicians may in their experience, without any difficulty, well recall flexion deformities which usually develop very insidiously. These deformities, in a large part, may be prevented by the proper use of some form of splint. It is natural for the unaided, badly infected finger to assume a position of flexion, because at rest

the fingers are normally held in a somewhat flexed position. The flexor structures in a finger outnumber the single extensor structure usually by three to one. When the process of repair starts, after infection has damaged the finger, and if the finger has been allowed to remain in a position of too great flexion, then scar tissue formation, which takes place under the bed in which the tendon sheath lies—the so-called phalangeal annular ligament—seriously restricts the use of a finger. If, in infections lasting as short a period of time as two weeks, some form of splint is not used to hold the thumb abducted, with the palmar surface of it facing the rest of the hand, very often adduction deformities occur, tremendously restricting activities of the thumb and interfering with actions of the other fingers. Resting an infected hand on a properly padded straight splint is perhaps better than the use of no splint at all. If, however, the thumb, on such a splint, is held close to the rest of the hand, with the palmar surface of the thumb facing downward, restriction of motion in this most important part of the hand very quickly follows.

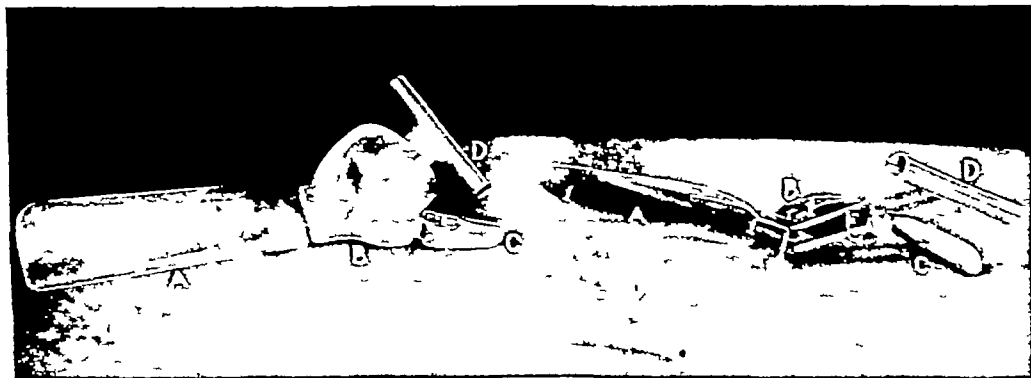
Bearing in mind that which has already been mentioned and which cannot be mentioned too often, namely, the normal position of the hand at rest, one readily sees the necessity for the use of some form of cock-up splint, some apparatus which prevents the extensor tendon being drawn down by the contracting powerful flexors, with perhaps a resulting so called claw-hand. In nearly every form of cock-up splint, some provision must be made for holding the thumb abducted. At rest, the thumb is held about halfway between full abduction and complete adduction. It is desirable, in placing the hand on a splint, to hold the thumb in a position of about three-quarters complete abduction.

If the doctor has reason to believe that a badly infected hand may possibly become permanently stiff, then some device should be used so that the end-result, if it be a crippled hand, will be one capable of some use. If the end-result finds the thumb adducted not far from the index finger, and if the index finger has become nearly rigid, in a straight-angle, it is at once obvious that these two most important parts of the hand have become nearly useless. It seems at times that no matter what one does, an entire hand, after a so called trivial accident with ensuing infection, becomes entirely stiff because of tendon destruction. In cases of this kind, one notes that frequently such results follow infections which develop from a type of puncture wound, such as the entering of a splinter of wood, or some other material, into any part of the hand. It is very natural for one to forget details as to the



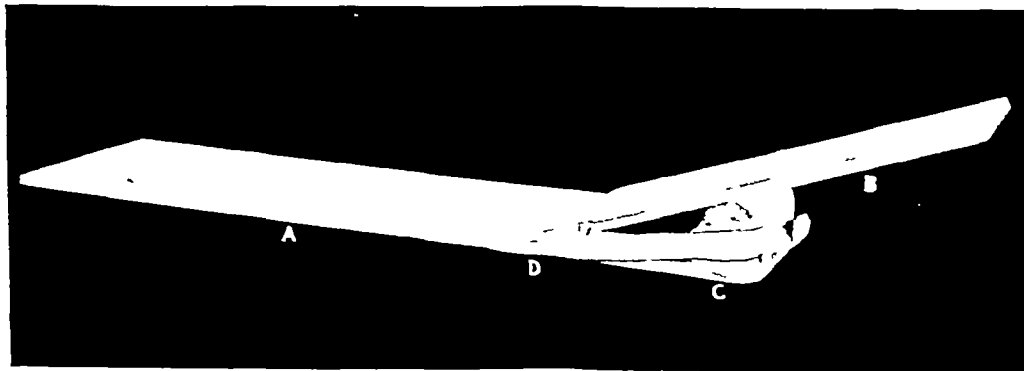
SPLINT NO 4.

- A. Forearm attachment.
- B. Metacarpal portion.
- C. Finger attachments.
- D. Thumbscrew for obtaining any desirable degree of cock up position. This splint is of value after plastic work or reconstruction work.



SPLINT NO 5

- Splint used for producing extension of contracted fingers when there is no real ankylosis
- A. Forearm attachment.
  - B. Metacarpal portion.
  - C. Thumb attachment.
  - D. Attachment for extension of fingers, which patient easily adjusts and controls, by use of thumbscrew



SPLINT NO 6

- A. Ordinary piece of splintwood for forearm.
- B. Piece of splintwood held to the main portion, at 'D' with a piece of adhesive plaster
- C. Ordinary roller bandage between these two pieces of splintwood placing the bandage back toward the angle increases the cock up and away from the angle decreases the cock up position. Any desirable degree of cock up position may be obtained with this bandage

traumatized, is much safer than local infiltration anesthesia

These splints designed within the past year will now be briefly described

No 1 The basis of all of these splints is this simple cock-up splint on which the metacarpal area, wrist, and forearm may be rested

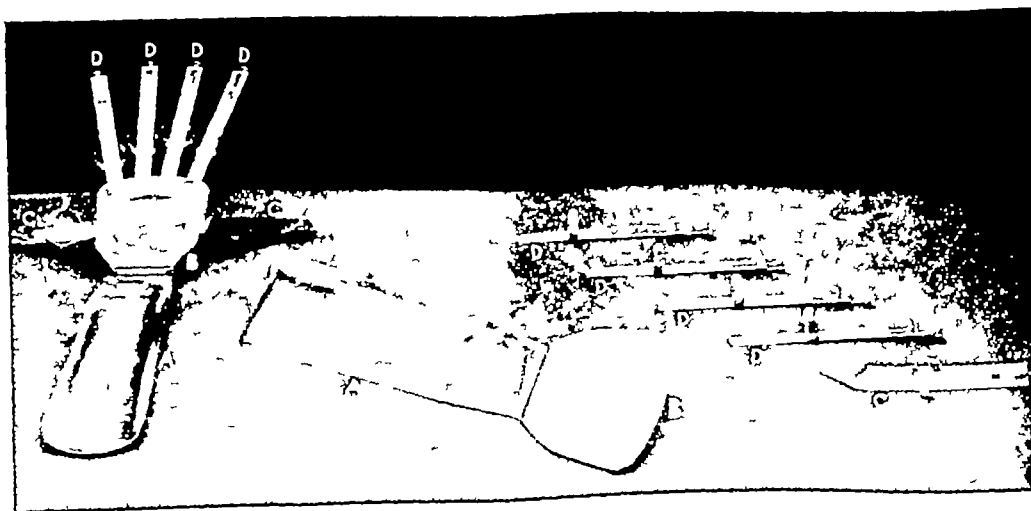
splint used in the treatment of generalized infections of the hand, where the fingers become markedly swollen, and particularly where disturbances in lymphatic drainage occur. With the aid of this splint, as the hand progresses, this tongue may be removed, the thumb attachment also removed, the meta



SPLINT NO 2

Same as Splint No 1 with platform for fingers and thumb attachment.

- A Forearm attachment.
- B Metacarpal platform
- C Detachable piece for resting fingers
- D Detachable thumb piece



SPLINT NO 3

Extension splint assembled and removable parts detached

- A Forearm attachment
- B Metacarpal portion
- C Thumb attachments for use in either the right or left hand
- D Finger attachments with little thumbscrews to produce extension also each finger and thumb attachment removed

You will note that the use of this thumbscrew permits any cock-up angle desirable, and the patient, properly instructed, may increase or decrease the cock-up angle by the use of this thumbscrew

No 2 By simply adding a tongue to the splint already described, and an attachment on which the thumb may be held comfortably at rest, this splint is made. It is an excellent

carpal area may be held in desirable cock-up position, and exercise of the fingers and thumb carried out. Exercises, carefully carried out, are most important in the aftercare of all infections of the hand. You will note with the use of this splint that motions in the metacarpophalangeal joints are permissible, while the palm of the hand, wrist, and forearm are held at rest.



any discussion. This year it was decided to revert to the usual custom and I hope there will be free discussion of each paper. We will take all the time that is needed provided the discussions are short and to the point. This paper is now open for general discussion. Dr. Cotton have you anything you care to say?

Dr. Cotton Boston No

CHAIRMAN HAYDEN This is a very important subject and I know there are many points which could be brought out. If there is no further discussion, I will ask Dr. Browne to close.

Dr. Browne The important thing about these splints if there be anything important with reference to the use of them is in the aftercare of the hand following infection. There is no indication

for the use of these splints in many types of acute infection such as subungual abscess or infection in the paronychium or eponychium but where infection results in the development of contractures where the flexor tendons contract and where the flexors which outnumber the extensors tend to prevent extension in the fingers then I believe splints such as these are of great help. The value of these splints is perhaps in preserving intact the physiologic activity of the intrinsic muscles of the hand. After any plastic procedure of course these splints are of value because they hold the hand at rest in a desirable position during the process of repair.

CHAIRMAN HAYDEN We will go on to the second paper which is to be given by Dr. R. Nelson Hatt and is entitled Diseases and Injuries of the Hip Joint.

## DISEASES AND INJURIES OF THE HIP JOINT\*

BY R. NELSON HATT, M.D.

ALTHOUGH the incidence of lesions, in and about the hip joint is not high when compared with many other morbid conditions that may afflict the human organism and, although the treatment of hip joint lesions has largely been assumed by those specializing in bone and joint surgery I find nevertheless, ample excuse in discussing the subject before this group because many pathologic hip joints result in untold misery or death and because medicine in general is concerned with all phases of human happiness or the processes which lead to its destruction. It was Oliver Wendell Holmes I believe who once remarked "Life begins with in the pelvis but often passes out through the hip joint."

It would require something more than twenty minutes to present comprehensively even a single topic of my subject but I pray that a rather modest synopsis may be found useful, if not particularly erudite or educational.

Since pathologic conditions of the hip joint may begin with the cradle and end with the grave and since each decade of life presents some group of conditions more common to its particular period than to any other the enumeration of these conditions may logically be arranged on the basis of ten-year periods, recognizing, of course, that overlaps may and commonly do occur. For example tuberculosis infections or mechanical imperfections arising in childhood may become quiescent for years and then reappear in later life.

In the first decade, three conditions are of major importance from the standpoint of incidence:

- (1) Congenital dislocations
- (2) Tuberculosis
- (3) Coxa plana (Legg-Perthes—Calve's Disease)

Read at the Annual Meeting of the Massachusetts Medical Society before the Section of Surgery Springfield June 9 1936

\*Hatt, R. Nelson—Chief Surgeon Shriners Hospital for Crippled Children. For record and address of author see This Week's Issue page 129

### CONGENITAL DISLOCATIONS

In spite of a fairly low statistical incidence probably every new-born infant should be suspected of having dislocated hips and the suspicion should be either verified or disproved by proper examination. The examination is not exacting or time-consuming nor is it one bit less illogical than the routine eye prophylaxis which the obstetrician accepts as part of his duty even though satisfied in a majority of instances that gonococcus infection does not exist. St. Luke 15 4—"What man of you having an hundred sheep if he lose one or them, doth not leave the ninety and nine in the wilderness and go after that which is lost, until he find it?" The congenitally dislocated hip is indeed a lost sheep for the deformity is not obvious until the child begins to walk and even then far too often the shepherd whom the mother consults fails to seek but allays her fears with the assurance that the awkward gait or limp is an inherited trait from the father or some other ancestor.

Acknowledging that the percentage of failures in treatment is a disgrace to surgery, mighty efforts have been made in the past ten to fifteen years to improve technique, devise new methods or more efficient appliances, but while the rest of the world took this direction, Putti of Bologna concluded that *early diagnosis* and *early treatment* represented the only logical answer and today, in the locality served by the Rizzoli Institute, every new-born child is carefully examined and x-rayed if doubt exists. Dislocated hips are treated in the early months by a simple triangular pad which holds the thighs in wide abduction and the percentage of cures, reported here by Putti, now stands at 97 per cent as compared with 50-70 per cent in other parts of the world. I have two slides showing a brother and sister, one treated at 3 years of age the other at 6 months. The difference in the anatomy of these two is obvious and the boy is practically certain to suffer from traumatic

No 3 Infection at joint surfaces causes much pain. Separation of infected joint surfaces is desirable, first, to prevent and control pain, and secondly, as a prophylactic measure against varying degrees of ankylosis. Small pieces of elastic material held to the lateral aspects of the terminal phalangeal areas of the fingers, or, when not used for longer than seventy-two hours, sutures introduced through the bulb of the finger may be fastened to this little pin, which, in turn, is attached to a movable device. A simple thumbscrew on this device very easily permits extension of a finger, by which joint surfaces are separated, and extension is obtainable. Care must be taken not to injure the tip of the terminal phalanx, in inserting a suture for extension purposes.

No 4 After infection has subsided, and when perhaps plastic procedures are necessary to restore usefulness in the hand, as far as possible, splints are most necessary after such operative measures have been carefully carried out. You will note that this splint consists of the first splint described, namely, a part for the metacarpal area, wrist, and forearm, and to this is added a special attachment for each finger. With the use of a thumbscrew, varying degrees of cock-up position may be obtained. You will also note that each of these finger attachments is removable.

No 5 If a hand has been treated for a relatively serious infection and no splint has been used, and if flexion deformities have resulted in contractures of fingers, without ankylosis, this splint is of very great value in obtaining extension of flexed structures, without doing harm. To extend a partially stiffened finger forcefully will not infrequently result in that finger being less useful than before manipulation was attempted. It is not difficult to give a patient an anesthetic and straighten out a stiff finger held in a position of flexion. However, the finger might have been of some use in a position of partial flexion, but is of very little value if stiff and in a position of nearly complete extension.

No 6 This simple cock-up splint, made with two pieces of splintwood, a bandage, a little adhesive plaster, and sheet wadding, is perhaps of more value than any of the splints described thus far because with a little strap added for abduction of the thumb it accomplishes what is desirable in the cock-up position. It is inexpensive and may be made by any physician in five minutes.

I am very grateful for ideas which the Medical Adviser of the Industrial Accident Board Francis D. Donoghue has given me in this work on infections of the hand. I am grateful to many house officers for their assistance to Mr. William H. Kraus who carried out my ideas in the making of these splints

and for the help obtained from papers written by the gentleman who will say a few words about them, namely, Dr. Torr W. Harmer.

### DISCUSSION

CHAIRMAN HAYDEN I would like to call to your attention the fact that Dr. Browne has a booth in the scientific exhibit where these various splints can be inspected more closely.

The discussion will be opened by Dr. Torr W. Harmer of Boston.

DR. TORR W. HARMER, Boston. *Members of the Massachusetts Medical Society*—I wish to congratulate Dr. Browne upon the thought that he has devoted to the preparation of these splints and upon their mechanical ingenuity. As many of you know, I have been a pioneer in opposing the use of splints in many phases of hand surgery, believing that their use favored the formation of anchoring tendon adhesions and stiffened joints. The best measures to combat such consequences, I believe, are accurate diagnosis, minimization of operative trauma and early active motions. When I examined these splints with Dr. Browne at his office I was impressed with them and since then I have sought to determine their applicability in hand infections. They do not seem to have a place in such localized infections as paronychia, felon, boil and carbuncle. Of the other commoner hand infections there remain punctured wounds, as of needles, with lymphangitis, fascial space infections such as those involving the mid palmar, thenar and lumbrical spaces, and tendon sheath and radial and ulnar bursal infections. In any of these types with lymphangitis massive fomentations are indicated. The initially infected area is covered with a light dressing, the rest of the hand, forearm and perhaps upper arm are coated with boracic acid ointment or vaseline and a massive fomentation consisting of part of a blanket, large rubber sheet and Turkish towel, is applied. This serves as an adequate splint.

Dr. Browne's splints are therefore, applicable to the treatment of late or neglected cases of hand infections in which the wrist or phalangeal joints have become involved. In certain cases of wrist involvement it is desirable to ankylose the wrist in a position of optimum function, that is in partial extension. The first splint that Dr. Browne showed does this admirably. In cases in which the phalangeal joints and the contiguous phalanges are involved it may be desirable to ankylose deliberately these joints in optimum position of function rather than resort to amputation. One of Dr. Browne's splints might be used to accomplish this end, although a simple curved metal splint that does not completely immobilize the wrist is satisfactory. In this way I have saved the fingers of several doctors.

In cases with partially stiffened fingers wider range of motion during active exercise of the phalangeal joints may be accomplished by stabilizing the wrist or metacarpophalangeal joints. An intelligent patient may be instructed to support these joints while performing his finger exercises. In unintelligent individuals Dr. Browne's phalangeal roller splint would be useful. The splints are clever. I am attempting to bring out their applicability. This it seems to me is in late or neglected cases of hand infection, not in acute infections.

CHAIRMAN HAYDEN The papers are limited to twenty minutes formal discussion to five minutes and discussion from the floor to two minutes. An exception will be made, however, in the case of Dr. Mont Reid's paper. I think there will be plenty of opportunity for discussion from the floor. Last year we planned a program of eight papers without

and neck, the gait resembling congenital dislocation

(3) *Transient epiphysitis* (Miller) This is probably due to a pyogenic embolus of attenuated virulence or conversely a virulent one met by an efficient defense mechanism In either event, as the name implies, a transient disturbance in the epiphysis or juxta-epiphyseal portion of the neck results, but quickly subsides with rest and general supportive measures The onset may suggest tuberculosis but the skin tests are negative and the course is one of regression rather than progression and rarely results in permanent impairment A few weeks of weight extension and attention to focal infection is sufficient in most cases

#### SECOND DECADE

Associated with the adolescent period, and seen only exceptionally in others, is slipped epiphysis, coxa vara of adolescence or epiphysiolysis of the Bostonians

As a rule, it occurs in the pituitary dysfunction individual of either the obese Frohlich type or the rapidly growing, slender variety Symptoms may begin with a vague ache in the hip, transient lump or sudden disability suggesting a fracture or dislocation The trauma however, is usually less severe than might reasonably be required for one of these major injuries Pain, when present, is often referred to the knee Flexion and extension may be free at the hip, but internal rotation and lateral motion are rather sharply limited X-ray may show slight displacement at first but recurring attacks or progressive sliding may, in the extreme case, lead to a complete dislocation of the head or the neck, and to great disability A variety of treatments are recommended, no one of which is universally applicable, open reduction being indicated in a few manipulation with impaction in others and weight extension alone will suffice in a few Within the past year, I have been fixing these hips with two or three threaded stainless steel pins of the Telson type The results have been uniformly satisfactory with full weight-bearing after six to eight weeks, but the series is too small and too recent for more than passing comment

#### THIRD AND FOURTH DECADES

*Arthritis*, traumatic and infectious, is common to these decades Growth has ceased, metabolic processes leveled off, but physical activities are in high gear Now it is that defects in the joint, more or less masked or compensated earlier by rapidity of tissue growth, begin to manifest themselves

The specific defects most commonly underlying painful hips in this period are those re-

sulting from coxa plana, shallow acetabula or partial ankylosis from old tuberculosis or other infections Bifurcation or arthrodesis for the single hip relieves pain and often restores the individual to a functional status compatible with economic independence

The reaction to traumatias, which earlier would have caused only transient disability, now results in changes within or about the joint—so called traumatic arthritis With protection and rest the process tends to subside while continued weight-bearing or vigorous manipulative procedures are apt to prolong disability Traumatic dislocation, both intra- and extrapelvic, are also most common within this age period

Infectious arthritis, usually a systemic disease, may, on the other hand, localize in one or both hip joints and, if progressive, as it usually is, great impairment of motion or complete ankylosis is the end-result With ankylosis of both hips, arthroplasty of one will afford great relief from the distressing handicap It is, in my experience, unwise to mobilize both hips unless the condition is localized to these joints as sometimes occurs in gonococcus infections

Hipposars bursitis is a condition which simulates hip disease and, as O'Connor of New Haven has suggested, we seldom see cases because the possibility is not in mind

#### FIFTH TO SEVENTH DECADES

The two outstanding conditions in the period of senescence are the following degenerative hypertrophic or osteo arthritis and fractures

*Malum coxae senilis* expresses the hypertrophic joint which, beginning with occasional twinges of pain, often referred to the knee, goes on to marked limitation of motion, adduction and external rotation deformity, apparent shortening and pain often sufficient to make crutches necessary Bony ankylosis never results spontaneously and may even be difficult to secure with a technically excellent arthrodesing operation Manipulations, plaster fixation, weight traction or other conservative measures are palliative Reduction of weight in the obese is extremely helpful since stress and strain increase discomfort In the robust individual or occasionally in the poorer surgical risk, when the pain element makes life a burden, operative fusion or the Lorenz type of subtrochanteric osteotomy is indicated The relief is most gratifying

Paget's osteitis deformans is mentioned as an occasional cause of painful hip in this age group

#### FRACTURES OF THE HIP

It would be quite presumptuous, if not altogether ridiculous, for me to attempt more than to epitomize the subject There are few sur-

arthritic changes in later life due to the poor mechanical adaptation between the femoral head and acetabulum, while the sister's outlook is normal. It is, therefore, my plea that every baby shall be given a careful examination of the hip joints just as routinely as it now receives eye prophylaxis. Briefly, the diagnostic points are (1) inequality of leg length, (2) asymmetry of the sulci of thighs and buttocks, (3) piston action or telescoping when the leg is forced up and down in the long axis of the thigh, (4) loss of normal fullness of the femoral head beneath the femoral artery, and (5) x-ray if doubt exists.

The manipulative or closed reduction is fairly successful up to about the fourth year, the percentage of successes varying in inverse proportion to the increment of age. Reduction should be gentle, following the teachings of Denuce, and the closed method abandoned for the open, regardless of age, whenever easy reduction is not possible. Open reduction, after six years of age, carries poor possibilities. Preliminary stretching by means of skeletal traction is helpful in many instances but, in the difficult case, circulatory disturbances in the epiphysis and subsequent aseptic necrosis occur with resultant stiffening of the joint. In the case of the unilateral dislocation, this is not so serious but two stiff hips are a catastrophe.

In the older cases, we have the choice of three operative procedures: (1) The shelf operation, originally described by Dickson, (2) fusion of the single hip and (3) the bifurcating osteotomy of Lorenz. The routine employment of any one of these measures cannot be recommended but each has its indication when pain and disability demand surgical aid.

The problem of the congenitally dislocated hip, like cancer, depends upon early recognition and early treatment for better results and, in both, the general practitioner of medicine, serving as diagnostician, accomplishes as much and is entitled to as great satisfaction as the specialist who has learned to reduce a hip or eradicate a circumscribed new growth.

#### TUBERCULOSIS

The etiology and pathology of this condition need no comment here. A considerable percentage (about 20 per cent) is of bovine type and this should be sufficient to interest us in the matter of a clean milk supply. The symptoms are usually insidious in their onset with limp, pain, usually referred to the region of the knee, with progressive deformity and disability. The x-ray early may show only diminution of lime salts and a slight fuzziness in the joint between the inferior portion of the head and acetabulum. Later, the joint space is narrowed and destruction is evident in varying de-

grees in the acetabulum and femoral epiphysis.

The von Pirquet or intracutaneous tuberculin tests are of significance in this age group, although not necessarily diagnostic.

Besides relieving suffering and deformity, early treatment with extension, followed by a protective splint or plaster, will materially shorten the destructive stage of the disease and arrive at the quiescent period when surgery will be most effective and satisfactory.

Although many will disagree with Hibbs and his followers that the cure of a tuberculous joint occurs only with solid fusion of the articulation, no one has, to my knowledge, ever answered his challenge to "produce a case, biologically or histologically proved tuberculosis, which retained a useful degree of motion in a weight bearing joint and which could be classified as permanently cured." Rollier of Leysin is the foremost challenger but would have his claims accepted without proofs. In my opinion, fusion or arthrodesis of the tuberculous hip joint by means of an extra-articular bone graft, represents the foremost advance in the control of hip disease known at the present day. Of course, no one will exclude the general medical aspects of tuberculosis and consider it a focalized disease reserved for orthopedic surgeons only, but will, rather, treat the situation as a systemic disease demanding local surgery.

#### COXA PLANA (Legg-Perthes—Calvé's disease)

This condition of unknown etiology closely simulates tuberculosis in its onset but the characteristic changes in the femoral epiphysis as seen by x-ray and a negative tuberculin reaction soon make differentiation easy. Typically it occurs between the fourth and tenth years, rarely earlier or later.

Acute symptoms call for protective measures, but the condition is self-limited and poor end-results are not common. Legg, the first to recognize and differentiate it and tuberculosis, concluded that prolonged fixation alters the course but little.

Three other conditions of this decade are to be mentioned in passing.

(1) *Congenital coxa vara* sometimes described as a congenital fracture of the femoral neck, is caused by a defect of the metaphysis, the epiphyseal plate being distorted with consequent shortening of the neck and loss of the normal angle. Clinically, it may be confused with dislocation. Corrective osteotomy affords good functional results.

(2) *Destructive epiphysitis* in infancy with loss of the femoral head. These infections are usually metastatic from an infected umbilicus, occasionally luetic and always accompanied by swelling and abscess formation. In my clinic only end-results are seen—loss of the head

fix the epiphysis in its proper position with a Smith Petersen nail or with pins the points being that we want the epiphysis firmly secured to its normal adjacent surface on the femoral neck and that the injury produced at the epiphysiodiaphyseal junction by the nailing will cause it to ossify. In other words the surest cure of this condition lies in obtaining early ossification of the epiphyseal line with the head and neck of the femur in their normal anatomical position.

My fourth consideration has to do with the malum coxae senilis. Until recently, very little had been done to relieve this condition. A year and a half ago however a new treatment was advocated by Smith Petersen which promises to be exceptionally hopeful. Those of you who recognize this disease and know its symptoms realize that the two main difficulties connected with it are limitation of hip motion and pain. Smith Petersen has devised an operation called acetabuloplasty to relieve these two outstanding symptoms. Motion of the joint is improved by removing a portion of the interior acetabular wall and pain is diminished or eliminated by excision of the anterior capsule of the hip joint. In the cases that have been operated upon which now number over fifteen practically all have received relief from pain and improved hip motion. I mention this new treatment of malum coxae senilis even though it is in the experimental stage because it seems to offer such great hope. Smith Petersen's original paper on the subject was given before the American Academy of Orthopedic Surgeons in January of this year is now in press and will be published very soon.

I have not time to go into the matter of fractures of the neck of the femur but I am in accord with the ideas of Dr Hatt that the nailing operation is the treatment of choice. I say this because up to the present time our percentage of excellent results with solid bony union obtained by nailing is 70 per cent and I know of no other method that will give equally good results.

CHAIRMAN HAYDEN: The paper is now open to discussion from the floor and I hope we will have a more free discussion. Anyone desiring to discuss it will kindly state his name and come forward.

DR. FREDERIC J. COTTON, Boston: There are only two things I want to speak of. In the first place with relation to Danforth's work a very pretty piece of work, very distinctly conclusive. I want to throw perhaps a little different light on it. Danforth has produced amazingly good results but he has done it at what seems to me to be an almost prohibitive price. It makes a great deal of difference to a growing child whether he is allowed to go about his work and play in a normal fashion with occasional interference with splint support or whether

that child is doomed to be crippled for a number of years thereby getting a little better hip. I agree with Legg. I think the price is too heavy to pay.

With relation to the slipped epiphyses I have been greatly interested in these cases. I feel that the operative results of a few years ago were pretty poor. I have not had difficulty in maintaining reduction. The question which is an open one is how long it has to be kept up. It seems to me that some form of nailing may be desirable. I am glad Van Gorder brought out the facts so clearly on consolidation of the hip with the neck. No one has spoken of the new work done by Bozan. I rather think he has the rest of us beaten. I saw his work in New York, and I think it is probably the thing we want to do because he has apparently shown that we can increase the rate of consolidation by drilling. But do not forget that these cases will consolidate without anything being done except reduction and that they will consolidate in an amazingly short time. I have three cases all of which have consolidated and the whole thing has happened since reduction was done the first of the year. That is rapid perhaps but we may increase that rapidity by Bozan's drilling. I think that with Leggs non-operative reduction and the type of nailing Dr Hatt spoke about you will obtain a much better result than you will from any form of open operation.

CHAIRMAN HAYDEN: I will ask Dr Hatt to close the discussion.

DR. HATT: I have nothing further to add only I wish to thank Dr Van Gorder very kindly for the excellent discussion of what I attempted to do.

CHAIRMAN HAYDEN: It becomes necessary at the close of the meeting to elect officers of the Section for next year. I would like to appoint a Nominating Committee at this time and ask the committee before the close of the meeting to present their recommendations.

(Nominating Committee consisting of Dr P. E. Truesdale of Fall River, Dr Peer P. Johnson of Beverly and Dr Garry deN. Hough of Springfield was appointed.)

The next paper is one to which we are all looking forward with a great deal of pleasure—Some Considerations of the Problems of Wound Healing by Dr Mont R. Reid of Cincinnati. Dr Reid has a reputation for being an especially meticulous and painstaking surgeon. I remember one occasion on which he traveled to Boston and did an extremely fine piece of vascular surgery the accounts of which sounded most fascinating. Dr Hopkins and I were in Cincinnati some months ago and persuaded him to come and address this meeting. It is with real pleasure that I present to you Dr Mont R. Reid.

## SOME CONSIDERATIONS OF THE PROBLEMS OF WOUND HEALING\*

BY MONT R. REID, M.D.

"THE subject of this evening's lecture is irritation" (wound healing), "which being

From the Department of Surgery of the College of Medicine of the University of Cincinnati and the Cincinnati General Hospital.

Read at the meeting of the Southwestern Virginia Medical Society, Galax, Virginia, April, 1930.

Read at the Annual Meeting of the Massachusetts Medical Society, Section of Surgery, Springfield, Massachusetts, June 9, 1930.

\*Reid, Mont R.—Professor of Surgery, University of Cincinnati College of Medicine. For record and address of author see This Week's Issue, page 790.

the foundation of surgical science you must carefully study and clearly understand, before you can expect to know the principles of your profession, or be qualified to practice it creditably to yourselves, or with advantage to those who may place themselves under your care." Astley Cooper.

"The proper treatment of wounds is to be

geons who will not agree that the problem of the fractured hip is difficult and that treatment by any method is a matter of considerable uncertainty. Analysis points to two factors which make up the problem (1) physiologic, the age incidence—senility enfeeblement and a poor or interrupted blood supply to the part and (2) anatomico-mechanical, the fracture site is not readily palpable or accessible to fluoroscopic visualization, and accurate reduction and effective immobilization are difficult to secure.

The one-time accepted classification of intra- and extracapsular fracture is protested on the basis that fractures through the neck are usually both intra- and extracapsular. Of the neck fractures, the subcapital carries the poorest prognosis, while the basal is apt to unite even with faulty reduction and fixation. The intertrochanteric also offers no difficulties except when widely separated and mistreated by the textbook surgeon who follows some particular authority on hip fractures, disregarding the fracture site.

We now feel certain that many past failures were the result of inaccurate reduction and with the present ability to check reduction in two planes, namely anteroposterior and superior-inferior or lateral views, one may not omit this important aspect of reduction with any less culpability than would be the case of using only a single view in shaft fractures. We need not discuss methods of reduction and fixation, but it is my personal opinion that Dr. Smith-Petersen has "hit the nail on the head." His work has been fundamental and, while some of us have followed reluctantly, my conviction of the value of nailing is now sufficiently strong that should my own seventy odd year old mother sustain a hip fracture, the benefit of this procedure would not be withheld from her, providing, of course, a surgeon competent to perform the operation were available. The relief from pain, the ability to sit and move about and the morale, a tremendously important factor, make a rather striking contrast with the uncomfortable old person, submerged in a plaster cast which, however expertly applied, does not completely immobilize the fracture, to say nothing of the tedious months of waiting for a possible nonunion all of which require stamina and fortitude.

I believe that not only the 50 per cent non-unions but the 20 per cent mortality of hip fractures will be lowered as the technique of so-called blind nailing becomes mastered by those who qualify in the treatment of such conditions.

In concluding, I confess that this attempt to cover a complete discussion of the hip joint from the cradle to the grave in twenty minutes is indeed but another evidence of our present mania for speed, but if, on the flight, we have glimpsed the baby with dislocated hips whose future may

depend upon your adjudication or have noted the oldster with high-soled shoe, crutches or cane, painfully going about or even condemned to a wheel chair existence when surgery has something better to offer, then the trip has been worth while and we have arrived at a happy landing.

## DISCUSSION

CHAIRMAN HAYDEN: The discussion will be opened by Dr. George W. Van Gorder of Boston.

DR. GEORGE W. VAN GORDER, Boston: Dr. Hatt is certainly to be congratulated on being able to condense so comprehensive a subject into a very brief paper of twenty minutes. He has done this clearly and concisely and in a very interesting manner.

I should like to mention four points in the way of discussion. First is the importance of determining at the time of the birth of a baby whether its hips are normal. Those of us who have anything to do with the study of congenital dislocation of the hip are impressed with the fact that the only solution of the problem is early diagnosis. I wish, therefore, to commend Dr. Hatt for strongly urging that, at the time of birth, the hips of children be examined routinely to see if they are normal. In so doing the attending doctor may be able to avert this tragic condition and save the child from a cripple's life.

My second point of discussion has to deal with Legg-Perthes disease and I will have to differ with Dr. Hatt's opinion that in the treatment of this condition weight-bearing is of little importance. Even though Dr. Arthur Legg makes the statement that weight-bearing had very little influence upon this condition so far as his end results were concerned, I think the recent work of Danforth has almost proved without a doubt that better results are obtained by keeping the child off its feet. This does not mean restricting motion of the joint or immobilizing it but does mean letting the child get up and about with a walking pattern bottom splint which permits the full weight-bearing in a raised shoe on the unaffected leg but no direct weight-bearing on the involved leg. The results of Danforth have been so striking that I and most of my orthopedic colleagues feel it is most important to restrict weight-bearing in these children, and in our treatment at the Massachusetts General Hospital we do not allow weight-bearing in these cases until the epiphyseal and pathologic changes show that this can be done without danger.

A third point I should like to make concerns slipped femoral epiphyses. In our clinic in Boston we have tried in the past three different ways of treating this condition. First we tried closed reduction of the slipped epiphysis followed by application of a plaster cast. We found that the results were not good; that the epiphysis could move even though the patient was in a plaster cast and that we could not always control its position. A second series of cases was then treated by open reduction followed by the use of a plaster cast. This series of cases gave results that were better than those of the closed reductions but were still far from satisfactory. A third group of patients was then treated by internal fixation of the epiphysis on the femoral neck by means of a Smith-Petersen nail. The results of this last method of treatment have been far superior to those previously obtained. So at the present time I feel that the best treatment is to

to promote the chances of infection. So far as fresh traumatic wounds are concerned we would today be far better off with a total ignorance of all chemical bactericidal agents and if we only utilized our knowledge of bacteria and of wound healing by gentle mechanical cleansing of the surrounding skin and open wound of all dirt foreign bodies, dead or devitalized tissue and by flooding the invisible bacteria away by means of sterile salt solution. Paré, was, in the light of modern knowledge, densely ignorant but he acted with amazing sanity, today, with a colossal knowledge of the properties of both bacteria and living cells many wounds are being treated with a lack of sound judgment. This fundamental principle of wound healing which Paré taught the surgical profession over four hundred years ago is constantly being disregarded. In order to worship at the shrine of Paré we must be rid of our bondage to advertising pharmaceutical concerns which delude our profession into the belief that the one essential aid to wound healing is the killing of germs with agents which they do not tell us are also killers of countless invisible delicate living cells. To date you can accept it as a fact that all germicidal agents are also capable of killing growing cells or of damaging the medium in which they must grow.

*Rest.* For many centuries, and especially since the writing of Baron Larrey upon this subject, rest of the wound has been recognized as one of the essential aids to wound healing. Let me quote from Billroth: "Hitherto I have not mentioned that the absolute rest of an injured part is always necessary. It may seem singular that I should mention it at all, you may think this should be considered a matter of course. I lay particular stress on it because injurious substances are taken from the wound into the blood, hence every muscular movement, and every consequent congestion of the wound, in short, everything that drives the blood and lymph more strongly into the vicinity of the wound, may eventually prove injurious. Of late, I rarely see contused wounds do so well as compound fractures of the extremities, where plaster dressings are at once applied, hence we have a strong hint to compel absolute rest of an extremity with a large contused wound without fracture, by applying a fenestrated plaster-splint. The cases where I have done this did remarkably well, even after amputations of the hand and foot, where the patient was very restless, I have applied the plaster-splint with excellent result, and think this mode of treatment which we shall describe more fully under compound fractures, may be more extensively used than hitherto." Complete recognition of a principle in the abstract is by no means followed by

an intelligent application of it. There can be little doubt that for a generation or two there has been a great neglect in the use of this unquestioned aid to the healing of wounds. Of late there has been some re-emphasis of its value, especially by Oir, Koch and others and the results have led to astonishment on the part of those who have recognized the manifest indications for the employment of the principle of rest in wound healing. And perhaps, the spirits of Billroth and Baron Larrey are rejoicing. In this instance, too, Homans is vindicated for writing that "In Surgery however as in every other art, fundamental matters are perennially being discovered, discredited, forgotten, rediscovered and reaffirmed."

*Blood Supply.* There is also no argument in principle that a third important factor in the healing of wounds is the blood supply. But I venture the belief that there is a great lack of consideration of this fundamental factor in the routine practice of surgery in this country. Men will readily agree that there are vast differences in the healing of wounds of the aged and the young individuals of the debilitated and the robust persons, and yet make very little allowance for these differences in the planning of incisions, the tying of ligatures and sutures. The whole problem of the harm of tension within wounds is directly linked with this matter of blood supply to them. Its consideration will dictate to the thoughtful surgeon the position in which he wishes a wound to be kept in order to secure for it the maximum blood supply. To him the crippling effects of edema on blood supply may indicate the elevation of a wound in a healthy part while a sluggish, trickling arterial supply may make him choose for the wound a position somewhat below the level of the heart. Recently an arteriosclerotic patient insisted on sitting up all night because of the relief he got from an agonizing pain he was suffering in an ulcer of his great toe. He had been thus trying to sleep for months. By simply elevating the head of his bed four inches he slept comfortably all night and for him this was well worth a trip from a distant part of the country. A practical regard for blood supply will substantiate the spacing of skin sutures so that a moist dressing, kept moist by the overlying oil silk or gutta percha will relieve tension by permitting the oozing of serum and blood during the period of swelling or edema in the wound.

Time will not permit me to cite other obvious applications which, no doubt, occur to you in connection with a consideration of this universally accepted principle of the rôle of blood supply in the healing of wounds.

*Hemostasis.* A fourth generally accepted aid to the healing of wounds is ideal hemostasis. The qualifying word "ideal" is used deliberate-



regarded as the most important requirement for the surgeon" Billroth

I offer these two quotations in lieu of any apology for the subject of this occasion's address. Should there need be any other I should only make mention of the prevalent feeling that wound healing is a subject to be mastered by the student in a course of pathology and later to serve as a filler in the first part of modern textbooks of surgery. At the outset I would make a plea for discarding this perfunctory attitude toward our problem and for re-establishing, as of old, the idea that a thorough knowledge of the principles of wound healing and its daily, thoughtful application is of the most fundamental importance in the practice of surgery. The importance of our subject is in no manner dimmed by the fact that anesthesia and modern methods of controlling hemorrhage have immeasurably widened and multiplied a thousand-fold the incidence of wounds. Nor is there any justification for the attitude that the discovery of bacteria and the subsequent development of countless aseptic and antiseptic procedures have to the slightest degree lessened the necessity of understanding the fundamental principles of wound healing. To me the reverse attitude seems to be the obvious one.

Wound healing is wound healing under whatever circumstances it may occur and the reparative processes are essentially the same, except in degree, regardless of whether the wound heals by first, second, third or any other intention, and whether it be considered infected or clean. Nobody could deny the importance of the presence or absence of bacteria in wounds but I hold it to be equally true that, in the problem of wound healing, their presence in a wound should be regarded as an incident or complication which cannot be intelligently evaluated or treated without a thorough knowledge of the process of wound healing and of what living tissue itself, in this process, can do with such a complication. Viewed in this light it is questionable if bacteria assume a role of greater importance in wound healing than do necrosis, debris and devitalized tissue, or granulation tissue, or fibrin or other factors which must be taken into consideration. Some day we may yet find Paré worshipped by the surgeons on an equal basis with Pasteur.

Throughout our surgical literature we read that the brilliant progress of surgery has been due to anesthesia, the control of hemorrhage and the control of infection. At the risk of the accusation of heresy and ingratitude I would suggest that we change "the control of infection" to read "a knowledge of wound healing" which, naturally embracing a consideration of infection, will, I believe, lead to a more intelligent practice of our art as well as to a greater perfection of it.

Wound healing is a daily problem in the life of nearly every doctor. Yet it would be interesting to know how few wounds are treated on the basis of study and thought to determine what form of treatment they need. My own experience with students, interns and doctors in the management of wounds is constantly disappointing. They seem always to be asking for a routine of therapy which, it is clear to me, should be evidently impossible of adoption by anyone who understands even the merest fundamentals of the processes of wound healing. For instance, I am repeatedly asked when skin sutures should be removed and my answer is when the wound is sufficiently healed. Or, how should open wounds be treated and my reply is to look at them and study them and then do what you think the wound demands. For a long time it has seemed to me that routines of wound treatment and thoughtlessness or ignorance of wound healing go hand in hand. And this statement is just as true in the management of deliberately planned wounds as it is in the case of traumatic, ulcerated and infected wounds.

To discuss any of the problems of wound healing in this paper it is, of course necessary to assume that the reader has a knowledge of the well-established principles or processes of wound healing. Among these must be mentioned the prevention or elimination of necrotic tissue and debris in wounds. Paré's original observations with respect to the importance of this consideration may well be compared with those of Lister in connection with the use of the carbolic spray to prevent infection. Yet, only the most casual observation of operative technique reveals that the subsequent refinements of aseptic and antiseptic procedures have far surpassed those which should have followed the original observations of Paré. Pasteur's work told the world what was causing the infection of wounds and unloosed, beginning with Lister and his carbolic acid, a veritable flood of bactericidal agents which show no signs of abating even today. Paré astounded himself and the surgical profession of his time when he learned that the sloughing incident to the burning of wounds with boiling oil or the actual cautery had a very deleterious effect upon the healing of wounds. He learned that the gentlest cleansing of the wounds with the commonest innocuous substances at his disposal at that time, such as water and soap, gave the best wound healing. Today, with our knowledge of the delicacy of growing living cells and of their lethal susceptibility to alcohol, ether, iodine, mercurochrome, merthiolate, carbolic acid, bichloride of mercury, and countless other substances, people go blithely on pouring them into open, fresh wounds to kill living cells and to complicate the process of wound healing and



to promote the chances of infection. So far as fresh traumatic wounds are concerned we would today be far better off with a total ignorance of all chemical bactericidal agents and if we only utilized our knowledge of bacteria and of wound healing by gentle mechanical cleansing of the surrounding skin and open wound of all dirt, foreign bodies, dead or devitalized tissue and by flooding the invisible bacteria away by means of sterile salt solution. Pare, was, in the light of modern knowledge, densely ignorant but he acted with amazing sanity, today, with a colossal knowledge of the properties of both bacteria and living cells, many wounds are being treated with a lack of sound judgment. This fundamental principle of wound healing which Pare taught the surgical profession over four hundred years ago is constantly being disregarded. In order to worship at the shrine of Paré we must be rid of our bondage to advertising pharmaceutical concerns which delude our profession into the belief that the one essential aid to wound healing is the killing of germs with agents when they do not tell us are also killers of countless invisible delicate living cells. To date, you can accept it as a fact that all germicidal agents are also capable of killing growing cells or of damaging the medium in which they must grow.

*Rest.* For many centuries, and especially since the writing of Baron Larrey upon this subject, rest of the wound has been recognized as one of the essential aids to wound healing. Let me quote from Billroth: "Hitherto I have not mentioned that the absolute rest of an injured part is always necessary, it may seem singular that I should mention it at all, you may think this should be considered a matter of course. I lay particular stress on it, because injurious substances are taken from the wound into the blood hence every muscular movement, and every consequent congestion of the wound, in short, everything that drives the blood and lymph more strongly into the vicinity of the wound, may eventually prove injurious. Of late, I rarely see contused wounds do so well as compound fractures of the extremities, where plaster dressings are at once applied, hence we have a strong hint to compel absolute rest of an extremity with a large contused wound without fracture, by applying a fenestrated plaster-splint. The cases where I have done this did remarkably well, even after amputations of the hand and foot, where the patient was very restless, I have applied the plaster-splint with excellent result, and think this mode of treatment which we shall describe more fully under compound fractures, may be more extensively used than hitherto." Complete recognition of a principle in the abstract is by no means followed by

an intelligent application of it. There can be little doubt that for a generation or two there has been a great neglect in the use of this unquestioned aid to the healing of wounds. Of late there has been some re-emphasis of its value, especially by Orr, Koch and others, and the results have led to astonishment on the part of those who have recognized the manifest indications for the employment of the principle of rest in wound healing. And, perhaps, the spirits of Billroth and Baron Larrey are rejoicing. In this instance, too, Homans is vindicated for writing that "In Surgery, however, as in every other art, fundamental matters are perennially being discovered, discredited, forgotten, rediscovered and reaffirmed."

*Blood Supply.* There is also no argument in principle that a third important factor in the healing of wounds is the blood supply. But I venture the belief that there is a great lack of consideration of this fundamental factor in the routine practice of surgery in this country. Men will readily agree that there are vast differences in the healing of wounds of the aged and the young individuals, of the debilitated and the robust persons, and yet make very little allowance for these differences in the planning of incisions, the tying of ligatures and sutures. The whole problem of the harm of tension within wounds is directly linked with this matter of blood supply to them. Its consideration will dictate to the thoughtful surgeon the position in which he wishes a wound to be kept in order to secure for it the maximum blood supply. To him the crippling effects of edema on blood supply may indicate the elevation of a wound in a healthy part while a sluggish, trickling arterial supply may make him choose for the wound a position somewhat below the level of the heart. Recently an arteriosclerotic patient insisted on sitting up all night because of the relief he got from an agonizing pain he was suffering in an ulcer of his great toe. He had been thus trying to sleep for months. By simply elevating the head of his bed four inches he slept comfortably all night and for him this was well worth a trip from a distant part of the country. A practical regard for blood supply will substantiate the spacing of skin sutures so that a moist dressing, kept moist by the overlying oil silk or gutta serena will relieve tension by permitting the oozing of serum and blood during the period of swelling or edema in the wound.

Time will not permit me to cite other obvious applications which, no doubt, occur to you in connection with a consideration of this universally accepted principle of the rôle of blood supply in the healing of wounds.

*Hemostasis.* A fourth generally accepted aid to the healing of wounds is ideal hemostasis. The qualifying word "ideal" is used deliberately

ly instead of the more generally accepted term "complete." There is no question that a hematoma of a wound interferes by tension with blood supply, prolongs wound healing, injects the presence of a large foreign body, and immeasurably encourages the development of the clinical signs and symptoms of infection and suppuration. Yet the excessive devitalization of living tissue by unnecessary ligatures of small blood vessels and too many tight sutures also interferes with blood supply, prolongs wound healing and invites infection (fig 1). Thus, in a

evaluate in the practice of surgery the contradictions inherent in the application of the fundamental principles of wound healing. Reared in a school of complete hemostasis, and cherishing this principle perhaps above all others, I would nevertheless like to acknowledge the debt of an apology to both Pare and Larré. A due regard for the harmful effects of necrotic tissue and the beneficial hemostatic effects of complete rest of a wound would probably have saved me the necessity of tying countless numbers of knots

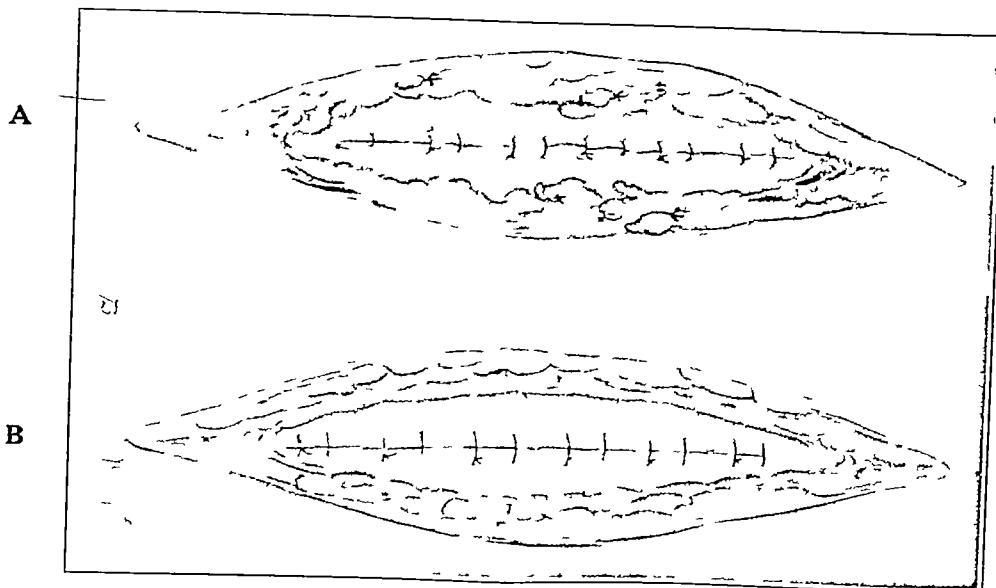


FIG 1 The improper and proper methods of closing a wound. With an equal amount of contamination wound A, which has been traumatized and the sutures tied too tightly, runs a much greater chance of suppuration than does wound B, in which the tissues have been properly approximated and no devitalized tissue left in the wound.

measure, the utilization of the principle of hemostasis in wound healing may run counter to Ambroise Paré's principle of the value of eliminating from wounds all necrosis. In the World War, experiences with the secondary closure of wounds taught us a great deal about the rôle that ligatures and buried sutures may play in the healing of wounds. The greatest successes resulted whenever it was not necessary to bury any ligatures or sutures. Plastic surgeons have perhaps the keenest appreciation of this great principle of surgery. They will spend literally hours in controlling bleeding by means of gentle pressure and warm saline compresses when surgeons less appreciative of the value of Paré's contribution would hastily resort to ligatures. They know that devitalized tissues and infections are the greatest wreckers of the success of their work. The same principles are equally applicable to all forms of surgery. Thus fourth principle in the healing of wounds, namely, hemostasis, injects forcibly, for the first time in this paper, the necessity for the great element of judgment if one would attempt to weigh and

*Infection.* A fifth great consideration in the healing of wounds is the prevention and treatment of infected wounds. Nobody can deny that efforts along this line should and do take the rank of first importance in the problems of wound healing. Modern surgery owes its very life to our knowledge of bacteria and the methods and means of preventing and treating their complications to the problem of wound healing. But are we not in the lethargy of perfect satisfaction with an unprecedented and almost miraculous spurt in our art of surgery which is yet far from its goal? Are we not in the doldrums of further progress by our slavish submission to the dictates of the manufacturers of germicides? Surely the use of every one with which I am familiar involves some sacrifice of other fundamental principles of wound healing. Is there no way of determining the price to be paid for their use and of deciding whether it is too great to be justified? In the matter of asepsis of the skin perhaps a recent reply to a salesman of a patented antiseptic solution may be permissible. He asked me what

germicide I used for the skin and I said that I did not care so long as the skin was first made macroscopically clean by the use of soap and water, alcohol, and ether and the germicide was free of germs and would not burn the skin. Except for the sin of using skin antiseptics in lieu of careful mechanical cleansing of the skin of all dirt, the modern preparation of the skin seems not often to violate the other fundamental principles of wound healing. When, however, it comes to using bactericidal agents in open fresh wounds one is confronted with the fact that if they are capable of killing micro-organisms they are also capable of killing or damaging the delicate living cells which in turn become excellent food for the growth of germs.

In general it may be stated that the conditions which are ideal for the destruction of bacteria are in no sense ideal for the growth of living cells. Likewise, some of the conditions which are ideal for the growth of living cells may be very conducive to the growth of bacteria. The very medium in which living cells must grow is usually quite attractive food for bacteria. And both bacteria and cells have about the same optimum temperature for reproduction. Thus it frequently happens that one's efforts to promote the healing of wounds may help the growth of bacteria and the reverse is also true. In the course of the healing of an infected granulating wound it is usually desirable to be switching back and forth from tissue reproducing measures to bactericidal treatment in order to get the best result. When the wound is relatively sterile the adoption of a policy of rest, optimum temperature and noninterference may result in a rapid healing, until the multiplication of organisms becomes so numerous that the plasma or medium for the growth of cells is all devoured by them. Then healing comes to a halt and attempts at further sterilization are in order.

'The sterilization of freshly made wounds is like the sterilization of the skin a relative and not an absolute matter' (Homans). Thus logically as well as practically the use of tissue damaging chemicals in an attempt at sterilization of fresh wounds is not often justified, for the resultant necrosis encourages too much the growth of the organisms not killed. Debridement of dead or devitalized tissue and of foreign materials plus a careful flooding away of the bacteria with sterile water or normal salt solution will usually leave the tissues in such a healthy state that they can cope with the few organisms present without exhibiting the evidences of clinical infection (fig 2). The harm which has resulted from pouring strong antiseptics into open wounds cannot possibly be estimated. It is impossible to estimate the harm and suffering which have come from the use of iodine for this purpose. For the less powerful antiseptics an appeased conscience which has

led to the ignoring of some of the fundamental principles of simple cleansing has often compensated for the lessened damage to the living cells. To quote again from Billroth: 'For the first treatment of the part poisoned by cadaveric matter I advise you to let cold water run on the wound for a long time, and not check the bleeding, if there be any. In many cases the injurious matter will be washed out and there will be no further infection. Cauterization immediately after contact with the poison, from a considerable experience on myself and on my students in the course of operations, I consider inadvisable.' It may be argued that he did not have at his disposal the modern refined antiseptics and this may be met by saying that he was not aware of the delicacy of living cells.

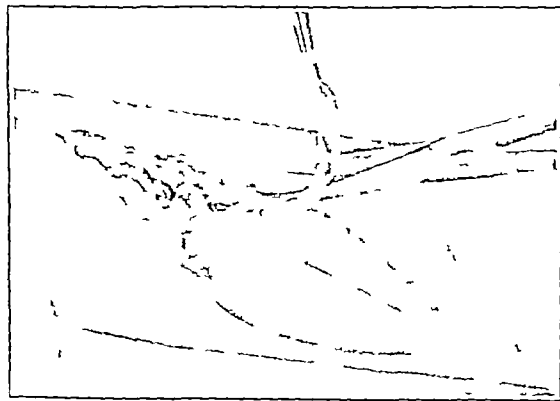


FIG. 2. Debridement of a fresh traumatic wound. Note how the devitalized tissue is being removed by sharp dissection.

or of the power of them to destroy bacteria. He was not even familiar with the rôle of bacteria in wounds and yet he made true observations which are constantly being ignored today.

Not long ago a friend of mine brought his boy hurriedly to my home because of a laceration of the end of his thumb. If the boy had not held his wound under running water the father would not have been so worried, he would have put some iodine on it and wrapped it up. As it was he was very afraid of an infection from the water. You can imagine his surprise when after cleansing the skin about the wound with benzine and then cutting away some dead fragments of skin, I gave the boy a stool by the sink and told him to run warm water on the wound while the father and I discussed fishing. After the lapse of ten or fifteen minutes a large amount of vaseline was placed on the wound and secured in place by a soft dressing incorporating a splint to immobilize the thumb. The hand was placed in a sling and the father was instructed not to bring him for an inspection of the wound for a week unless he should show an elevation of temperature or complain of pain. No antiseptics were used in the open wound. There was practically no pain and no

fever At the end of a week the wound was healed The father, like thousands of other people of our generation, had been imbued since birth with the necessity of using iodine or some antiseptic to kill the germs in such a wound He had never seen a wound like that heal without getting red and painful He didn't know why I had used a splint or why the hand was put in a sling or why the fragments of dead tissue were cut away To him the one essential on such an occasion had always been to kill the germs at whatever cost in pain, suffering and infection He could only shake his head and say, "I do not understand"

This father's attitude reflects, I believe, the viewpoint of the average layman today with regard to the handling of trivial wounds and probably that of the vast majority of the doctors of our time with respect to all wounds

I have dwelt at some length upon this fifth consideration in the healing of wounds because it is my belief that the modern antiseptics of fresh wounds does not justify the wholesale violation of some of the other fundamental principles of wound healing, notably those dealing with the harmful effects of necrosis and debris and the beneficial effects of rest In this whole important business of the control of infection in fresh wounds, there is a crying need for a sane modification of our viewpoint so as to make it fit more harmoniously with other established principles of wound healing rather than permit it to usurp them

*Granulation Tissue* An understanding of the problems of wound healing presupposes an appreciation of the importance of granulation tissue Its formation is essential to the healing of every wound Besides, in the absence of an epithelial or endothelial protection, it becomes the body's best defense against invasion of bacteria Nearly seventy-five years ago Billroth reported the following experiments to his students

"If you inject a drachm of putrid fluid into the subcutaneous cellular tissues of a dog, the result will be inflammation, fever and septicemia If you make a large granulating surface on a dog, and dress it daily with charpie soaked in putrid fluid, it will have no decided effect On the borders of the inflammatory new formation the lymphatic vessels are closed, on the granulating surface there are no open lymphatic vessels, hence no reabsorption takes place" Hence, the protection of granulation tissue from traumatization and insults of any nature becomes of paramount importance in the consideration of wound healing On its exposed surface there are always bacteria and I am sure that those of you who have had any considerable experience with wounds can recall fatal cases of septicemia resulting from the

numerous examples of local exacerbation of the infection Its appearance usually reflects accurately the severity of the surface infection, as well as the adequacy of its blood supply In the absence of surface infection, granulation tissue always assumes its healthiest possible appearance Juicy, pale and swollen granulations probably represent their best efforts to combat infection The obvious indication is to help rid them of the infection and not to rid the body of their protection Once relatively free of infection whether by their own efforts or with the aid of Dakin's solution, some other mild germicide or moist pressure dressings, they will spontaneously return to what is regarded as their normal, red, granular appearance It seems to me that it is fair to assume that granulations are always doing the best they can under any given circumstances and that there is no justification for speaking of healthy and unhealthy granulation tissue It would appear that they are most pleased when least disturbed

*Tissue Growth* While I have made hasty mention of the five or six factors which most surgeons agree are of fundamental importance in understanding the behavior of wounds and in the intelligent treatment of them, I believe that the more modern work of Carrel, Lewis and many others with tissue culture, justifies the addition of another important factor which should be necessary and helpful, namely, some understanding of the actual process involved in the growth of living cells in a wound For, after all, it is the multiplication and growth of cells which cause the healing of a wound, save for what is accomplished by the process of contraction

In a large sense nearly all of the principles of wound healing which I have been discussing have a rationale in the beneficial effect they have on the growth of living cells Dead or devitalized tissue diverts the energies of growing cells from the problem of repair to one of elimination of foreign materials Rest of wounds promotes the growth of living cells just as it does in the case of the medium for tissue growth in vitro Nourishment for the growth of cells comes from the blood stream and hence the more perfect the blood supply, the more ideal will be the medium in which the cells must grow In addition to the poisonous effects of their toxins upon the living cells and body mechanism as a whole, bacteria also devour the medium for the growth of cells in wounds just as they do the medium for the growth of cells in vitro Hemorrhage, as well as the surgeon's necrosis, gives to the cells the burden of removing additional foreign bodies A casual observation of the behavior of superficial wounds in the winter and summer, illustrates the effect of temperature upon the growth of cells in wounds

just as its effect is well known upon the growth of cells in vitro

If you will imagine a straight clean wound accurately approximated, the medium for the growth of cells which repair that wound will lie in a small crevice between the cut edges (fig 3A). If you will then imagine that wound spread open like the leaves of a book, the medium will lie on a surface with one side exposed instead of being compressed into a thin line between two opposing surfaces of living tissue (fig 3B). In either instance the process

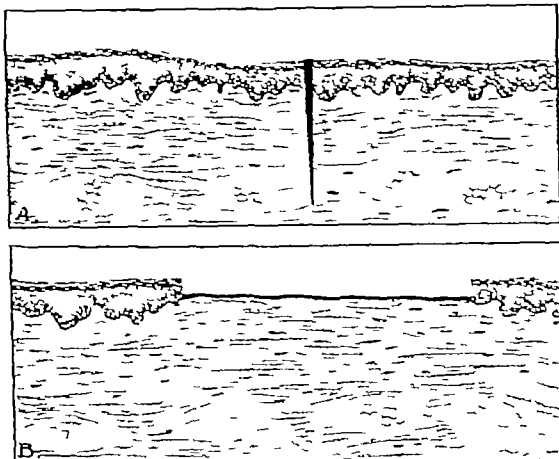


FIG 3 Schematic illustration of a closed fresh wound and an open wound. In either instance the healing processes are essentially the same. The fibrin serves as the medium into which granulation tissue and epithelium must grow.

of repair is essentially the same except in the amount of the growth of epithelium. In both instances this medium is absolutely essential to the growth and multiplication of cells. The epithelial cells do not push themselves out over the surface, nor do the elements of tissue which form granulation tissue divide and jut out into space. They grow into and devour this coagulum of fibrin which is constantly forming on raw surfaces and granulation tissue. It, as we have repeatedly shown, a fresh wound is so energetically dammed that no fibrin or media can accumulate, then there will be no formation of granulation tissue or growth of epithelium (fig 4). When possible, nature's ideal way of preserving this medium for the growth of living cells is the formation of a sterile scab. To her I suspect that this means healing by first intention regardless of whether the edges of wounds are closely approximated or widely separated. Infection, traumatization, dressings which pull it away, interference with the blood which supplies it, and the unwise use of chemicals and bactericidal agents which may destroy it are the principal handicaps to the preservation of this medium. In the experiment just cited, if the wound be covered with vaselined gauze and left undisturbed for twenty-four hours

the base will become covered with healthy granulations and there will be obvious growth of epithelium. Perhaps in a few days, infection may likewise destroy the medium and halt the processes of healing. Striking an optimum balance, in such a wound, between methods to promote the growth of tissue and those to help control the infection can be no haphazard routine. It must be based on careful observation.

Would it not be well to regard every wound as a new growth in which, paradoxically, our every effort should be to promote its growth, knowing that some as yet not understood, biologic principle will terminate the process when healing is complete? With this conception constantly before us it seems to me that we would be more likely to evaluate properly our efforts to assist and, moreover, what is probably more important, develop an alertness to change them to meet the ever-changing demands of a healing wound.\*

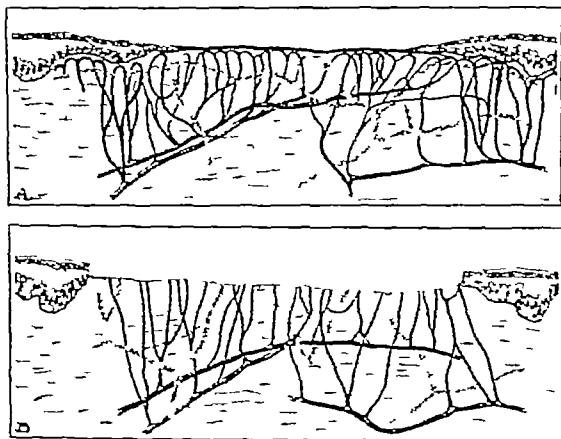


FIG 4 A A granulating wound. The vessels and the lymphatics are closed. When there is no traumatization there is no absorption, and the underlying tissues are best protected. B An open wound without fibrin showing the open vessels and lymphatics. Absorption takes place rapidly from such a surface.

With this general discussion of the fundamental principles which should be considered in the treatment of wounds it may be permissible for me to describe for you the attitude adopted in our clinic toward the treatment of certain types of wounds. This seems especially advisable since, as I have indicated, the utilization of some of these principles is often not compatible with the employment of others.

**Surgical Wounds.** In the minds of most people there are two types of wounds—clean and contaminated or infected—and the division between them is as sharp as between night and

Throughout this discussion of wound healing I have deliberately omitted any mention of restoration of function of the wounded parts. From the pure standpoint of the principles of wound healing it does not merit serious consideration but from the viewpoint of the results of healed wounds it may become a matter of some importance.

day Little thought is given to the fact that every open wound, surgical or accidental, receives bacterial organisms and that the term *infection* is applied only in those instances in which the processes of wound healing exhibit obvious difficulties, in varying degrees, in combating this contamination. Little do we appreciate the natural protective forces inherent in wound healing. For every obvious difficulty with infection the processes of wound healing probably spare us the worry a hundred times by taking care of similar bacterial contaminations.

It is reasonable to assume that with the modern methods of sterilizing supplies and instruments, with the universal wearing of masks and gloves, and the effective preparation of the skin there is not a wide variation in the actual bacterial contamination of surgical wounds. In the vast majority of instances clinical infection is directly traceable to the burden of added insults heaped upon the tissues of the wound by the operator and his assistants. Viewed in this light there was never a truer statement than that of Homans in which he says that, "The patients' best defense against infection lies in the perfection of the operator's technique."

In the performance of identical operations and with presumably the same bacterial contamination, one surgeon may get an infected wound while the other will get primary healing. Some surgeons can excise a badly infected breast or close a severely contaminated laparotomy wound and virtually get healing by first intention while others will invariably get infected wounds.

The answer is in how well the soil has been prepared for the growth of the bacteria by the production of necrosis, traumatization of tissues and interference with blood supply. Definite efforts to avoid this invitation to the growth of bacteria are made in our clinic. Whenever possible blood vessels are tied before division and the end projecting beyond the ligature is removed. As few clamps as possible are used and whenever they are, a definite effort is made to grasp only the bleeding vessels. Vessels which in the judgment of the operator will not bleed upon removal of the clamps are not tied. When mass ligation is unavoidable, transfixion ligatures are employed and tied only tight enough to stop the bleeding and leave the included tissue viable. All obviously nonviable tissue, whether caused by ligatures, clamps or trauma is excised if possible. Sharp dissection with the knife in the belief that it is less damaging to living tissue is the almost invariable rule. The use of clamps on the peritoneum and other tissues for purposes of traction demands an extraordinary excuse. The use of retractors and

especially the self-retaining ones is reduced to a minimum. The placing of sutures in fat or muscle is almost never done because of the delicacy of these structures as well as the almost invariable uselessness of such sutures. Sutures are tied with extreme care lest their tightness or subsequent tightening due to edema will interfere with circulation (fig 1). Some surgeons will tie with great force the sutures buried in the infinitely more delicate tissues and then close the skin loosely. If there is any justification for this I cannot understand it. Before closing a wound it should be free of bleeding, of air and of blood clots. In the case of local anesthetics the patient is made to cough or strain to see if any untied vessels will begin to bleed. Pressure with gauze for a few moments on the freshly cut surfaces of a wound may reduce by 50 to 75 per cent the number of clamps which otherwise might have been used. Finally the wound, when closed, should present tissues, as nearly as possible, as healthy in appearance as when the incision was first made. Drainage of clean wounds is never employed. In wounds where there is known to be serious bacterial contamination or considerable oozing of blood, debride provision is made for gaping, between the skin sutures. In the case of such abdominal wounds, no sutures are placed in the line of the incision but, instead, the wound is closed with through-and-through silver wire sutures placed far removed from the edges of the wound. Moist dressings are applied and kept moist for a considerable time by means of a rubber protective so that tension of the wound may be relieved by seepage during the period of edema or slight hemorrhage (fig 5). The wound is placed in the position of optimum general circulation and completely immobilized when thought necessary and especially during the period of recovery from anesthesia. Unless indicated by pain or evidences of infection or hemorrhage, the wound is left undisturbed until it is thought it may be desirable to remove some of the stitches.

It is obvious that these are only a few of the safeguards against the development of infected wounds due to errors of operative technique. It is not necessary to mention any others, for, when an operating surgeon works with a mind acutely conscious of wound healing, he will unconsciously adopt all of them, if he does not, what I have already said becomes well-nigh useless and the patients will go on paying the price in pain, disablement and even death.

It must be added that in many, many instances the very efforts of a surgeon to prevent the infection of surgical wounds constitute the direct cause of the infection. His very

efforts at destruction of germs have made the living tissues incapable of coping with a contamination which otherwise they might have handled with ease

Finally a good aid to the healing of surgical wounds is to make every unexpected infection or failure of an even hoped-for primary union a matter for serious investigation. This policy in any clinic is always beneficial to the problems of the healing of surgical wounds

*Traumatic Wounds* We are paying for the advancement of industry and for our economic development an enormous price in wounds, disability and lives. Nearly seventy-five years

soap and water, alcohol, ether and possibly painted with some of the accepted skin antiseptics. None of the alcohol, ether or antiseptic is permitted to enter the fresh wound. Next sterile draping is done as though for a clean surgical operation. If any clamps were placed to control hemorrhage they are held up by an assistant during the washing and skin preparation and are now removed by him and replaced, when necessary, by fresh sterile clamps by the operator. If the operation is to be done under local anesthesia the skin infiltration is made well away from the edges of the wound. With this preparation the wound, and skin edges, are

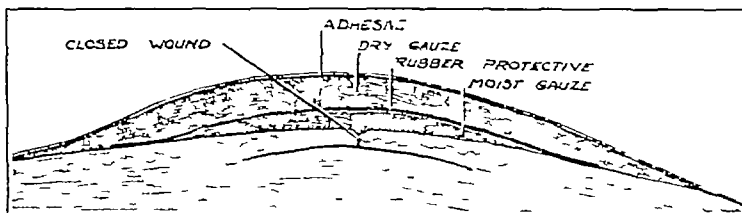


FIG 5 A diagram showing the method of dressing fresh wounds which have been properly closed.

ago Billroth said, "You may imagine, not only how much sweat but how much blood clings to the many evidences of modern culture." When one reads such a statement the usual reaction is a smile if one thinks of Billroth's remarks in comparison with the problems of our time. The differences in the magnitude of the problems of his time and of ours may be just cause for a smile, but there is serious doubt if genuine chagrin should not be the result if we should consider the progress which has been made in handling these problems. Viewed in this light the surgeons of today are face to face with a distinct challenge lest our efforts in the treatment of traumatic wounds be subject to censure by the surgeons of the not distant future.

To meet this challenge we have endeavored to develop in our clinic methods of treatment of traumatic wounds which we believe are based upon the accepted principles of wound healing of our time. Our application of these fundamental principles of wound healing in this very large field of surgery may, of course be wrong but our conscience is free in that we may not be accused of acting without thought or under the influence of domination by the bactericidal therapeutists.

In the case of all traumatic wounds, bleeding of any consequence is first controlled preferably by elevation of the part and pressure or when absolutely necessary the clamping of individual vessels. The wound and surrounding skin are then flushed rather vigorously with a large quantity of sterile normal salt solution. The skin about the wound is shaved, washed with

debrided by sharp dissection of all debris, dead, crushed, devitalized or dirt-stained tissues. Frequently it is necessary to use soap and water on the fresh wound in order to remove greasy dirt. The fewest possible ligatures are placed in the wound. After this another very careful and thorough irrigation of the wound with hydrogen peroxide followed by sterile normal salt solution, is done. The wound is then ready for surgical repair and dressing. Only when absolutely essential are buried sutures used. Skin sutures are tied loosely and widely spaced so that there will be free seepage from the wound into the moist dressing. Usually it is far better to use no skin sutures which may in any way imperil the blood supply to either side of the skin edges. An avulsed flap of skin is far more useful alive and unsutured than dead from the anemia of the tension of the sutures which place it beautifully back into perfect position. To tack a flap of skin loosely back one-half inch or more from the opposing edge is, I think, the hardest thing in the world for a young surgeon to do. About six months ago a young girl of fourteen years received in an automobile accident an extensive laceration and contusion of the left thigh. A large triangular flap of skin and muscle was turned upward from just above the knee. The transverse tear extended from the lateral side of the thigh across the top to the mesial aspect where it met a vertical laceration which extended upward for more than six inches. The muscles were torn and loosened up as far as the greater trochanter, exposing the bone from which a considerable area of periosteum had been removed. The tissues were

badly stained and there were many stones of varying sizes throughout the extent of the wound. After a painstaking irrigation and debridement such as described above, requiring more than an hour, the triangular flap of skin and subcutaneous tissue was gently laid back and sutured with three sutures which failed by one and a half inches to approximate the skin edges. A moist dressing was applied and the leg was encased in a large plaster spica which included the abdomen and foot. Although this patient was unconscious from a concussion of the brain and incontinent for three days during which the dressings became soaked with urine, the first dressing was not made for ten days. Healing was by first intention. The function of the leg is unimpaired even though much of the quadriceps and lateral leg muscles was cut away. No buried sutures were placed in the wound. It is amazing with how little scarring even large open wounds will heal if there has been little or no loss of skin.

In many instances, when no attempt at closure is made, the wound, after the preparation described, is filled with vaseline, dressed and immobilized for many days without even inspection unless pain or fever may indicate an infection which the tissues may need some help to handle.

*Infected Wounds.* In the problems of an infection or an infected wound it is obvious that time will not permit me to be specific even if it were possible to deal specifically with the countless problems which arise. This subject must of necessity be dealt with in general terms.

Our only hope of aiding in the solution of these problems must be based, first, on an intensified effort to disseminate to students and doctors a thorough knowledge of the fundamental principles of wound healing as we understand them and, secondly, in an endeavor to make every act in behalf of an infected wound conform to a judgment which should be arrived at only in the light of one's best knowledge of these principles. If infected wounds were so handled there could be no criticism of thoughtlessness, of addiction to a routine or of slavery to one principle of wound healing when the application of others might be more indicated by the condition of the wound. Such an approach to these problems would at least have the virtue of wounds being treated according to the abilities of those handling them, which I fear is very far from the facts at the present time.

One thing very essential to the intelligent handling of infected wounds is a correction of the more or less prevalent feeling that such wounds are either treated or not treated depending upon whether they are operated upon

and subjected to antiseptic therapy. The care of infected wounds is not by any means solely a problem of drainage and germicidal therapy. Many kinds of wound infection are often best treated by a stressing of some principle of wound healing other than that of active control of the infection. An unwillingness to cut into acute infections such as lymphangitis, furunculosis, cellulitis, where there is no suppuration may easily be justified by an avoiding of traumatization and necrosis, a refusal to open up new avenues for a spread of the infection and by a desire to observe the fundamental principle of rest. The use of moist warm dressings to prevent edema, the forcing of fluids, transfusions and various kinds of intravenous therapy, all find a rationale in an effort to improve the blood supply. A course of procedure based on such reasoning is just as much a part of the problem of treating infected wounds as is incision and antiseptic therapy. That some infected wounds such as osteomyelitis, certain types of joint infections as well as other kinds of infections may do best under a stressing of the principle of absolute rest and, as a corollary, nontraumatization has been amply proved. In general, when antiseptic fluids cannot be made to reach a part of an infected wound it is always a question whether the traumatization incident to their use justifies the harm which may result from a disregard of the value of rest.

Prior to actual suppuration it is difficult for me to justify any incisional measures in the treatment of infected wounds. It has always seemed to me that the price to be paid in the nature of traumatization, necrosis, and the opening up of new avenues for the spread of the infection, is not warranted by the good which may result from the release of tension or the establishment of drainage for subsequent suppuration. It is most unusual for this to be done in our clinic.

When, however, suppuration has occurred, sooner or later some form of external drainage or excision becomes necessary in order to avoid the damage of tension, accumulated toxins, and the spreading of the infection in undesirable directions. Deciding when to do this and how are obviously problems of such magnitude and variation that they cannot be considered. Even if it were possible to consider this phase of our problem, I would have to admit that it is impossible for me to put in writing my course of procedure. I can decide only after careful study of each individual instance of suppuration as it arises. I would venture the one generalization that radical surgery of suppurating wounds. That it, however, should be done with the least amount of damage to the existing granulation tissue is obvious.



I realize the inadequacy of my treatment of the subject of infected wounds, but I do trust that I have indicated the necessity for carefully considering and weighing all the fundamental principles of wound healing before deciding upon a course of procedure in any given case of infection. This process should become second nature to one's mental behavior each and every time an infected wound is inspected.

**Granulating Wounds** It now remains for me to make only a few comments on the treatment of open granulating wounds. My assumption will be that all of them are infected, for it is the rarest occasion to see such a wound of any size heal under the benign influence of a sterile scab.

It is obviously essential that anyone charged with the responsibility of treating a given

either from the edges or from islands of grafted skin (fig 6). In the minds of most doctors, efforts to promote this process are regarded as cut-and-dried simple problems but it is my belief that in the handling of this kind of a wound is to be found the greatest sinning against the principles of wound healing. Throughout the country there must be in practice literally thousands of different ways of treating such wounds and in probably over 80 per cent of the instances the granulating wounds are healing in spite of, or under the handicap of, what is being done for them. Reduced to its simplest terms the main problem is to get the granulating surface covered with the best possible medium for the growth of epithelial cells. As I have said before nature's ideal way is the formation of a sterile scab but this very rarely occurs over a large

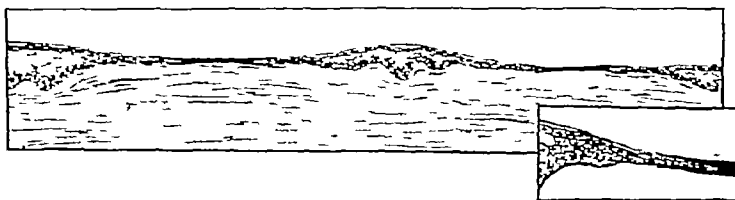


FIG 6 Diagram showing growth of epithelium into fibrin from skin edges and on either side of skin graft.

granulating wound should have clearly in mind what he wishes to accomplish with it. If it is desired to perform a secondary closure, then intensive bactericidal therapy (with Dakin's solution in our clinic) until the wound is macroscopically free of necrosis and exhibits in the smears and cultures of its secretions a very minor degree of bacterial contamination seems clearly to be the course to follow. To us it also seems the wisest course to follow in preparing granulations for the reception of any kind of skin grafts. If the granulating surface is but a mere incident to some deep-seated more important pathologic process such for example as osteomyelitis, it is often most illogical to treat it at the expense of rest and nontraumatization which may be clearly indicated for the more important underlying process. The granulations, if not interfered with, will nearly always provide adequate protection to the body against invasion of bacteria while adopting the principle of rest in treating the other condition. If, however, the time arrives when there will be no or very little sacrifice to deep healing, we believe that efforts to promote epithelization of the granulations by skin grafting or otherwise up to the point of sinus should be begun.

By far the most frequent problem in connection with granulating wounds is simply to get the epithelium to grow over the surface

granulating surface. Thus practically all granulating wounds should be so handled that this medium will form to the best advantage even in the presence of infection for, without any medium, the epithelial cells cannot grow.

Dakinization or antiseptic therapy may be

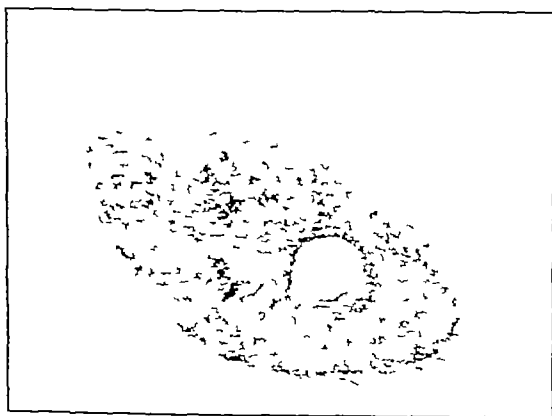


FIG 7 A. Skin graft on an intensely dakinized wound. No fibrin. No growth of epithelium.

so thorough and energetic as to make a granulating surface practically sterile and of a most healthy, red, firm appearance and yet no epithelization will occur because the medium for the growth of cells is also dissolved away (fig 7). Or, granulations may be so infected

with bacteria which practically destroy all this medium that the growth of epithelial cells will come almost to a standstill. Again, coarse gauze placed next to the surface may at each dressing remove practically all of this medium which becomes enmeshed in it, as well as cause bleeding which opens up avenues for the spread of infection (fig 8). Dependent

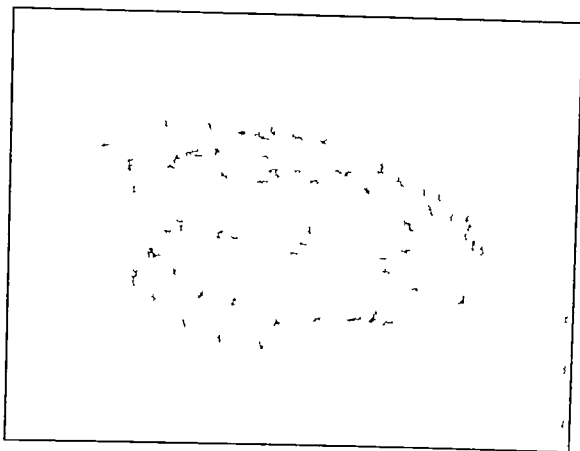


FIG 7 B Condition of a wound after discontinuing intensive dakinization. Note coating of fibrin which forms a medium into which new cells will grow. Epithelization has begun.

edematous parts with granulating surfaces may so interfere with circulation as to hinder the formation of this fibrinous medium as well as cause the exudation of serum which carries it away. In connection with such ulcers Billroth has this to say "It is remarkable how rapidly the common ulcer of the leg begins to improve in appearance as soon as the patient has taken a warm bath, simply applied a wet

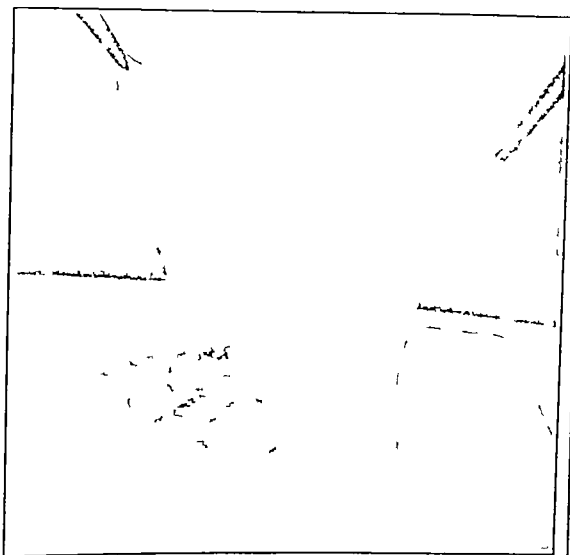


FIG 8 A Drawing showing effect of removal of dry gauze from a granulating wound. Note the bleeding and the removal with the gauze of the delicate fibrin covering of the wound.

compress to the ulcer, and remained in bed quietly for twenty-four hours." Time and again I have seen amazing results when the responsibility for the care of a chronic ulcer which has been dressed daily for months in a clinic has been thrown back upon the patient with advice such as that quoted from Billroth. The thick, dried, contracting dirt and sebaceous material on the skin about the ulcer disappears, the circulation improves, granulations take on a healthy appearance, fibrin forms on their surface, and epithelization takes on a new impetus. The only warning has been that under no circumstances should the granulation tissue be made to bleed. The good re

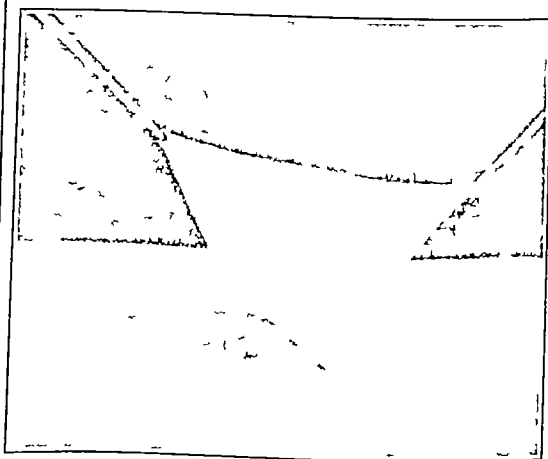


FIG 8 B Drawing showing the condition of a wound which has been treated by the application of vaselined old linen. The delicate fibrin layer is not removed by this dressing.

sults are undoubtedly due to the improvement of the circulation which, in turn, improves the supply of medium for the growth of epithelial cells.

If a doctor would, therefore, treat a granulating wound intelligently, he must keep constantly in mind the process by which it must eventually heal, he must be willing to change his procedures to meet the demands of the wound. When antiseptic therapy has been pushed so far that it is stealing away the medium for the growth of cells, he must be willing to let up on its use and, vice versa, when bacteria are devouring all of it he must be willing to re-emphasize the use of antiseptics. Efforts should be made to get to the wound the best possible blood supply. Dressings which stick to the wound, and then pull away the fibrinous medium, should never be employed (fig 8). When, as occasionally happens, a nice layer of healthy fibrin is seen covering a granulating surface, every effort should be made to preserve it instead of, as I have frequently seen, to remove it (fig 8).

## SUMMARY

This paper is a plea for re-emphasis of the importance of the study and application of the fundamental principles of wound healing. It is the author's belief that the amazing progress of surgery during the past generation and a half has made our profession and the public satisfied with results which fall far short of those possible to obtain. In a large measure this progress has been the result of a knowledge of germs and of efforts to control their harmful effects in wounds. However, wound healing is not alone a problem of germ destruction. Throughout this paper it has been repeatedly stressed that the price of aseptic and antiseptic procedures frequently means the sacrifice at a loss of other fundamental principles of wound healing.

Among these other principles which are discussed are the gross and invisible necrosis of living cells, rest, hemostasis, blood supply, the protective value of granulation tissue and an adaptation of the knowledge gained from tissue culture to the processes of a healing wound.

Only when it becomes our constant aim to evaluate all these considerations of the problems of wound healing both in the art of making wounds as well as in the treatment of them will there result the greatest benefit to those whose misfortune it is to bear them.

## DISCUSSION

CHAIRMAN HAYDEN: I am sure everyone here is conscious as I am that we have been listening to an exceptionally fine paper, one that is as valuable to the general practitioner as it is to the surgeon. The discussion will be opened by Dr. Frederick B. Sweet of Springfield.

DR. FREDERICK B. SWEET, Springfield: Mr. Chairman and Fellows—Some weeks ago at my request Dr. Reid sent me a copy of his paper. I read it twice carefully and it has given me particular pleasure to hear it again this morning. There is so little in the paper with which one can disagree that its discussion becomes rather difficult. I shall therefore content myself with the emphasis of some of the points which seem most important.

The subject is timely for in spite of all the advance made by modern surgery, infection, herniation and hematomas in surgeon-made wounds are complications of not infrequent occurrence.

I have long been of the opinion that chemical germ killers are also cell killers and have used and advocated the use of normal saline solution as superior to all such chemicals.

Dr. Reid's insistence on protection of granulations and rest of the injured part cannot be too strongly commended. His entire treatment of the subject has been sane and scientific and I am sure that we have all been given a better understanding of wound healing than we had before coming here this morning.

DR. ARTHUR ALLEN, Boston: Mr. Chairman and Members of the Section—It is very fitting that this subject that comes to us today should be brought by one of Halsted's most illustrious pupils. Dr. Reid

is amplifying and extending the ideas about wound healing and the care of wounds that Professor Halsted taught a quarter of a century or more ago.

The question of how one can add to this paper is a very difficult one to me. I like Dr. Sweet, had a copy sent to me to read and I immediately had copies made to pass around among my young surgical friends because I feel it is really a masterpiece on the subject.

The abuse of chemical antiseptics may be pretty well illustrated by a fracture of the patella which came into the hospital a few years ago. There was a small wound through the skin and the first aid surgeon injected two or three syringefuls of tincture of iodine through the small opening into the knee joint. This particular patient spent almost a year in the hospital and ended up with only a partially functioning joint.

Today with our knowledge of preoperative preparation so much improved with the experience derived from the teachings of our predecessors and with our own experience in postoperative care of patients we have yet a more important factor in the management of surgical patients and that is surgical technique. Surgical technique is a broad term which applies to all the phases in operative surgery, whether the wounds be posttraumatic or made by the surgeon. Tissue must be handled with utmost care. We must strive to injure as few living cells as possible, whether by chemicals, pressure or by long exposure to an unnatural habitat. Dead spaces must be closed and foreign bodies must be reduced to a minimum.

This last important principle of good wound healing is well illustrated by the comparison of surgical wounds in which catgut has been used for hemostasis and sutures with those in which fine silk has been used. One will find that a thyroid wound, for instance, will have as little induration and that there will be as little stiffness in the neck within three weeks after the operation where fine silk is used as at the end of three months following the use of catgut. Also the amount of serum to be aspirated or drained is negligible after a careful diathermy and fine silk technique as compared with the usual situation following the use of catgut. Halsted used fine silk in his wounds as did all of his pupils. General use of this material did not become popular at least in New England. Whipple has recently brought forth very convincing arguments in favor of fine silk. The marked reduction in septic wounds following its use is explained on the scientific basis that a catgut tie and knot of equal strength to fine silk will create a foreign body reaction approximately twenty times as great.

We have in the past four years used a combination of diathermy, hemostasis in the superficial tissues and fine silk on the deeper and more important vessels in all thyroid, breast and hernia wounds with very gratifying results. We believe it is only a matter of time when fine silk instead of catgut will be very generally used in clean surgical wounds.

DR. E. L. YOUNG, JR., Boston: I want to ask Dr. Reid one question in relation to something that he said in his very excellent paper. It is the old question of the relation of syphilis to the healing of wounds. Does Dr. Reid believe that there is ever enough toxic material in the cells of the body in the presence of syphilis so that it influences the healing of wounds?

CHAIRMAN HAYDEN: Is there any further discussion? If not, Dr. Reid, would you care to close?

DR. MORT REID: I am very grateful for the splendid comments made by Dr. Allen and Dr. Sweet.

concerning my paper I do not think that I have anything more to add except that I want personally to change the statement that Dr Allen made in regard to the use of silk I have never used anything except silk for ligatures and sutures in clean surgical wounds, and I do not think I will ever change my attitude with respect to its use until there is developed a new and better suture material.

In regard to the effect of syphilis, I do not think there is any particular difference in the wound healing except in so far as syphilis interferes with the blood supply. If you are operating on a syphilitic patient you must make up your mind that the blood vessels are not going to be so good as they are in a normal, healthy individual, and consequently make allowances accordingly.

I want to thank you for being so attentive to my

paper, and I thank you again for the privilege of coming here and speaking to you.

**CHAIRMAN HAYDEN** For the benefit of those who were not here at the beginning of the meeting I would like to say that the splints which Dr Browne exhibited as part of his talk are available for inspection by anyone who cares to see them upstairs in the scientific exhibit. There are two papers on the program today which are founded on the mechanical ingenuity of their authors.

The next paper, by Dr Donald Munro of Boston is based on the use of a very ingenious instrument which he has devised. Dr Munro is going to speak on *The Cord Bladder,—Its Definition, Treatment and Prognosis When Associated with Spinal Cord Injuries*.

## THE CORD BLADDER—ITS DEFINITION, TREATMENT AND PROGNOSIS WHEN ASSOCIATED WITH SPINAL CORD INJURIES\*

BY DONALD MUNRO, M D †

**INTRODUCTION** The term "cord bladder" as commonly used refers to those urinary bladders whose function is abnormal on account of disease or injury of the spinal cord. In this paper, I propose to deal only with the type of cord bladder that is associated with spinal cord injury. Under this general heading the dysfunction of the bladder has been held to extend all the way from complete retention to so called automaticity. Therapeutics has ranged from noninterference through all degrees of urethral catheterization to suprapubic cystostomy. It has been considered successful when more or less periodic micturition has resulted, although the surgeon has usually ignored the possibility of associated residual urine. Furthermore this end-result has implied no actual knowledge of the functional efficiency of the detrusor muscle, and practically none of the storage capacity of the organ. In most cases no distinction is drawn between the varying types of spinal cord lesion which produce the vesical abnormality. It should not come as any surprise to us then that, under the circumstances, urinary sepsis is the recognized chief cause of death after the first week in any type of cord injury. Nor should we be astonished at the futility of the argument about whether, like the hen and the egg, the cystitis preceded the catheterization or the catheter the cystitis.

I propose to show from a study of a series of 105 cystometrograms selected from a total of 200 observations and made on a group of twenty-four cord injuries that cord bladders are classifiable into certain recognizable groups.

From the Neurosurgical Service of the Boston City Hospital.  
Read at the Annual Meeting of the Massachusetts Medical Society Section of Surgery Springfield June 9 1934 and in part before the American Urological Association at Boston May 19 1936.

†Munro Donald—Assistant Professor of Neurological Surgery Harvard University Medical School. For record and address of author see This Week's Issue page 790.

Also, that, in conjunction with the use of tidal drainage as a sole therapeutic agent, an only ing urethral catheter can be kept in either male or female bladders for many months without producing urinary sepsis, and that, as a result, this fatal complication has almost been eliminated in all types of spinal cord injury. The cystometry is but a repetition of the fundamental work already done by Holmes,<sup>1</sup> and Denny Brown and Robertson.<sup>2</sup> It has been extended, to be sure, to include the study of bladder function from within a few hours of the receipt of the cord injury to the end-result after months and years. This has, however, merely confirmed their theoretical postulates. The therapeutic application, however, is my own and is a continuation of work first published in 1934.<sup>3</sup>

*The Cord Bladder* With adequate cystometric examination and provided the spinal cord lesion is a transection above the sacral segments, cord bladders pass through three definite stages. If the cord lesion is a hematomyelia or edema at any level, this is increased to four. Incomplete cauda equina lesions produce changes that duplicate those seen with hematomyelia. Complete cauda equina lesions or complete destruction of the sacral segments have not occurred within the scope of my experience. However, Denny-Brown and Robertson<sup>2</sup> have demonstrated that the bladders associated with these entities show only two sets of recognizable characteristics.

Regardless of what stage of bladder dysfunction is studied, it is measurable by certain criteria that have been set up as the result of the analysis of normal bladder activity and as determined by those same cystometric methods (figure 1). These criteria include (1) the amount of the initial rise, and the curve of intravesical pressure in response to a given amount of fill, (2) the presence, absence and

periodicity of emptying contractions during the fill, together with the absolute amount of residual urine as expressed in terms of percentage of fill, (3) the storage capacity of the bladder, and (4) the reflex and voluntary sphincteric activity. Interpretation of these data together with an understanding of the normal neurophysiology of the urinary bladder as conclusively demonstrated by Denny-Brown,<sup>2</sup> Learmonth,<sup>4</sup> the author<sup>3</sup> and others will settle the question

Cystometric Findings	Average Normal Figures	Interpretation in Terms of Function
Alterations in Intravesical Pressure { Initial Sustained	2 50 cm 3 18 cm	Detrusor tonic response to a minimal stimulus Detrusor tonic response to a constant stretch stimulus
Presence Absence and Rhythmicity of Emptying Contractions	May be either present or absent	Efficiency of detrusor contractions and the presence of inhibitory impulses from higher levels
Amount of Residual Urine in % of Fill	0%	
The Amount of Fill before the First Emptying Contraction	70% have over 200 cc	The storage capacity of the individual bladder
Activity of the Anal and Bulbocavernosus Reflexes	Active	The reflex of the external urethral sphincter
Resistance to Passage of Urethral Catheter	Active	Measure of voluntary control of external urethral sphincter and therefore voluntary inhibition of micturition

FIGURE 1  
Interpretation of Cystometric Criteria in Terms of Function

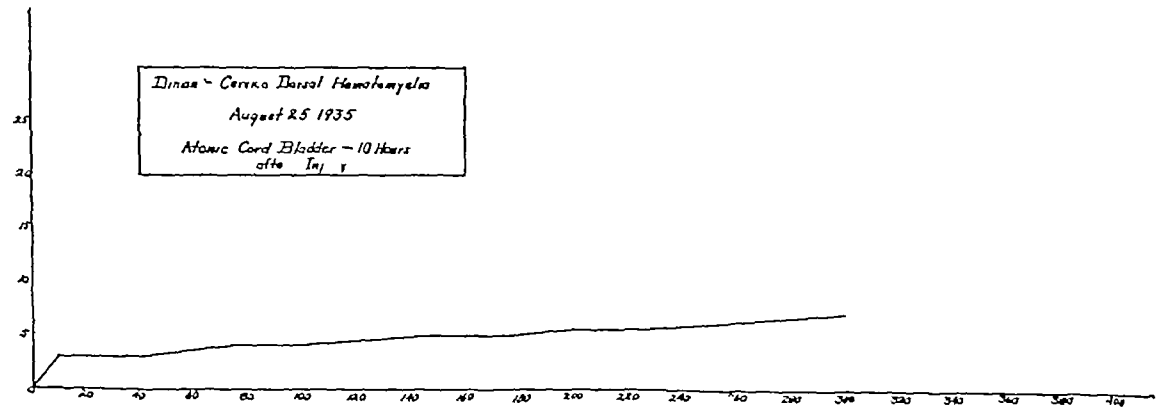


FIGURE 2

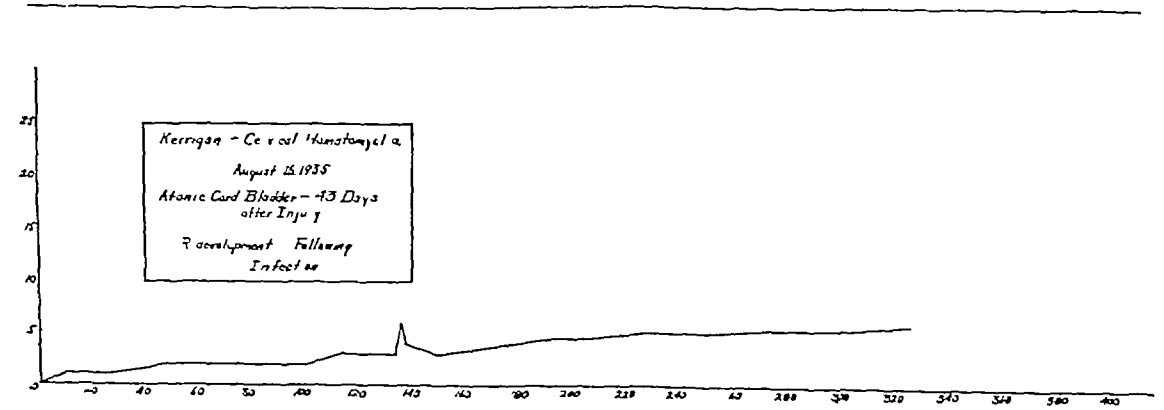


FIGURE 3

of, (1) the presence and degree of tonus of the detrusor muscle, and its reflex response in terms of contraction. This will apply to both minimal sensory and constant stretch stimuli. (2) The efficiency of the emptying contractions, and their inhibition by impulses from higher centres. (3) The storage capacity of the individual bladder, and (4) the degree of reflex facilitation or voluntary inhibition of micturition.

*The Atonic Cord Bladder* (figure 2) The atonic form of cord bladder is present at the beginning of every spinal cord injury and during the period of spinal shock. It also recurs after any degree of recovery of bladder function (figure 3) or in the presence of a high degree of general exhaustion. Its presence is due to the areflexia accompanying these conditions and affecting chiefly those segments in the region of and below the level of greatest cord damage. Normally the fundamental activity of the bladder depends on the integrity of the sacral spinal reflex arcs. In the presence of areflexia this activity ceases and atonicity sets in. This atonic group, to be sure, merges imperceptibly into the succeeding type of cord bladder activity but the average findings are characteristic and peculiar to the group (figure 4). Such a bladder has

complete retention up to the point of extreme distention. The detrusor muscle is atonic and at most shows only the curve of distention of an elastic bag. Emptying contractions are completely absent, and the residual urine comprises 100 per cent of the fill. The storage capacity is limited only by the passive distensibility of the bladder wall. There is neither voluntary nor reflex activity of the external urethral sphincter. Treatment is best carried out by placing the patient on tidal drainage<sup>3</sup> with the intravesical pressure level set at from 25 cm.

*Autonomous Bladder* (figure 5) As the patient begins to recover from his spinal shock and, provided no major infection or exhausting procedure such as an operation intervenes, his atonic bladder gradually changes into the second one of the cord bladder groups. This second stage is present in all forms of spinal cord injury and in addition is said by Denny Brown and Robertson<sup>2</sup> to be the end stage in those patients who have had a complete destruction of either the sacral spinal segments or the cauda equina. With the central origin of the vesical nerve supply in mind it will be seen that these latter conditions constitute external denervation of the bladder. In any case, whether this denervation is temporary or permanent and in

Cystometric Criteria		Cystometric Data			Normal Cord Bladder		Normal Bladder
		Atonic Cord Bladder	Autonomous Cord Bladder	Hyper-tonic Cord Bladder	Transected Spinal Cord	Other Cord Injuries	
Initial Tonus in cm	High	8 1/2	11	53	19	12	8
	Average	1 3/4	5 2/5	16	7	3 3/4	2 1/2
	Low	0	0	3	1	0	0
Average Change in Tonus with Fill	Of 400 cc and over	+	+	+	—	+	+
		6 3/4	9 2/5	23 1/2	1 85	1 04	3 54
	Of 300 cc and over	+	+	—	—	—	+
	Over 0	5 3/4	8 1/4	+	1 96	—	3 40
	To First Contraction Only	—	—	16	2 09	1 5	—
Emptying Contractions	Present	0	14	26	24	29	14
	Absent	9	3	0	0	0	16
Capacity for Storage in cu cm	Over 400 cc	5	7	6	0	1	11
	300 400 cc	4	6	7	0	1	7
	200 300 cc	0	1	7	1	11	4
	100 200 cc	0	2	4	8	7	3
	50 100 cc	0	0	0	9	8	3
	0 50 cc	0	1	3	6	1	3
Average Amount of Residual Urine	% of Fill	82 5%	42 6%	19 5%	5 97%	16 2%	0%
Anal and Bulbocavernosus Reflexes	Present	0	Insufficient Data	Insufficient Data	Insufficient Data	29	30
	Absent	9				0	0
Resistance to Catheter	Present	0	0	0	0	29	30
	Absent	9	17	26	24	0	0

FIGURE 4

spite of the continued segmental areflexia, the detrusor muscle and internal sphincter now exhibit signs of activity. This is due to impulses transmitted through a reflex arc whose efferent and afferent arms are both parts of the neural plexus that lies wholly within the vesical wall. Apparently this intramural mechanism takes control of the detrusor contractions even though

not reach these bladders from the higher centres and both the voluntary and reflex activities of the external sphincter are absent. Infection or exhaustion may cause an autonomous bladder to revert to an atonic form. As an end-result following sacral or cauda equinal destruction these bladders are described<sup>2</sup> as being hypertrophied, and incapable of storing any signifi-

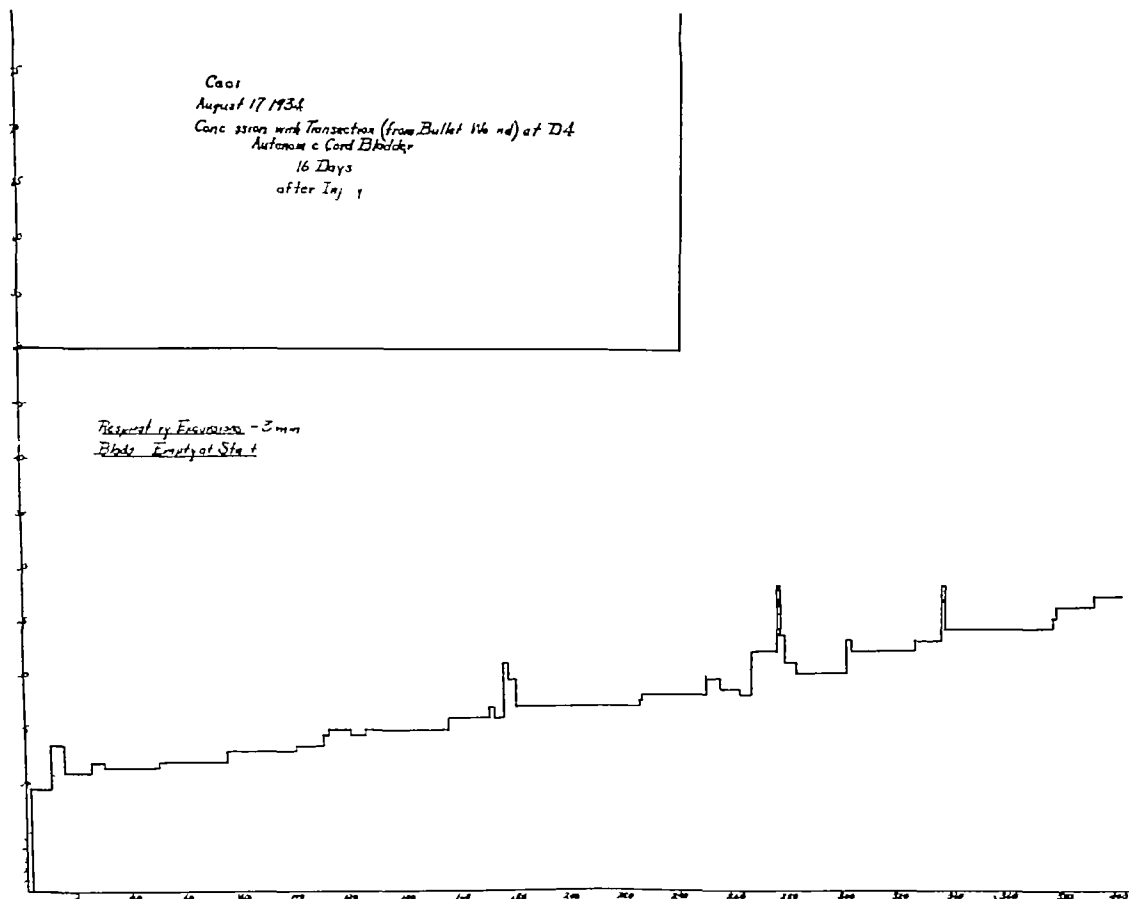


FIGURE 5

the bladder is completely disconnected from the central nervous system. Such a bladder is therefore autonomous or self-governing and as such may be spoken of as the autonomous or autonomic stage of the cord bladder. These detrusor contractions, however, may be only sufficient to cause a reciprocal relaxation of the internal sphincter and may not reach a size sufficient to produce emptying other than by leakage. The symptoms of this stage are therefore those of overflow distention (figure 4). Cystometrically the initial tonus is about five times that of the atonic type and the rise of the sustained tonus averages  $8 \frac{1}{4}$  as opposed to  $5 \frac{3}{4}$  cm. Emptying contractions are inefficient or may be absent and there is over 40 per cent of residual urine. The storage capacity is over 300 cc in 76 per cent. Inhibitory impulses do

not reach these bladders from the higher centres and both the voluntary and reflex activities of the external sphincter are absent. Infection or exhaustion may cause an autonomous bladder to revert to an atonic form. As an end-result following sacral or cauda equinal destruction these bladders are described<sup>2</sup> as being hypertrophied, and incapable of storing any signifi-

*The Hypertonic Cord Bladder* (Figure 6) Further progress toward recovery is seen in the third stage of cord bladder—the hypertonic cord bladder. This is present in all types of spinal cord injury except those with sacral and cauda equinal destruction. In the presence of either general infection or exhaustion it may revert to either the autonomous or atonic forms. In its earlier development it merges with the auton-

omous type just as in its later stages it tends to become more like the next succeeding uninhibited type. It is essentially a condition in which the segmental spinal reflex activity is again manifesting itself but in a completely uncontrolled manner. Such a bladder empties itself at irregular intervals and the patients are constantly wet unless they are on tidal drain-

droppe. Under other conditions of treatment the storage capacity of these bladders is materially impaired in a very short time.

*Normal Cord Bladders* If progress is not interfered with by injudicious or insufficient treatment, the hypertonic cord bladder is succeeded by the normal cord bladder. These are of two types depending on the nature of the original

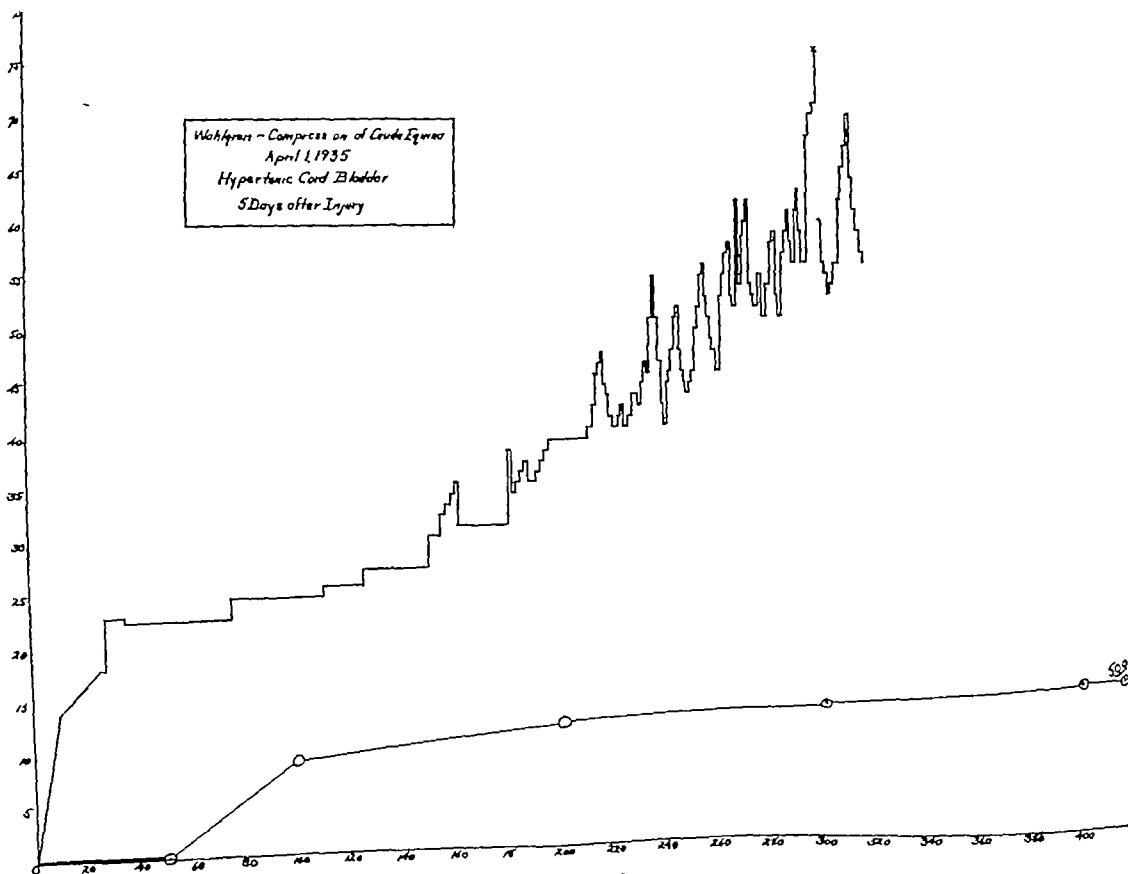


FIGURE 6

age (figure 4). The initial tonus of the detrusor is on an average sixteen times that of the atonic bladder and may go as high as fifty-three times. The rise of sustained tonus averages  $23\frac{1}{2}$  cm—four times higher than that of the atonic bladder. Emptying contractions are constantly present and the residual urine amounts to only 19 per cent of the fill. The storage capacity of slightly more than half the cases is below 300 cc. There is no inhibition of contractions and the reflex and voluntary control of the external sphincter are probably absent in the transections and vary in the other types of cord injury. Treatment is best carried out by tidal drainage with the apparatus set to give a high (20 to 30 cm) intravesical pressure. Because of this high pressure and the resultant interference with the drop mechanism on the apparatus a rubber flutter valve mounted on a T tube must be introduced into the line just below the glass

cord injury. Although, in the last analysis, both types may be considered objectively and subjectively normal by the ordinary tests, it is possible by the comparison of cystometrograms of these bladders with those of known normal bladders to show differences in function between the two. I have differentiated them, therefore, as normal cord bladders in preference to speaking of them as normal bladders.

*The Uninhibited Normal Cord Bladder* (figure 7). The simplest of the normal cord bladders is the uninhibited. It is present in all forms of cord injuries except the destructive lesions of the sacral segments and cauda equina. It is the normal end-result as far as vesical function goes in all cases of complete or nearly complete transection of the spinal cord above the level of the sacral segments. It probably represents what has been loosely spoken of in the past as the "automatic bladder" and is actually the ex-



pression of the normal fundamental uninhibited reflex activity of this organ. Subjectively and objectively, except by cystometry, it appears to be a normal bladder that empties itself completely at more or less regular time intervals (figure 4). The initial tonus is three times that of the normal bladder. Instead of rising

fluid intake and must be so arranged as to permit him to retain his bladder contents without leakage for as long a time as possible. In transection cases this is the best end-result that can be hoped for. As a result the patient must be prepared to continue on this regime for the rest of his life.

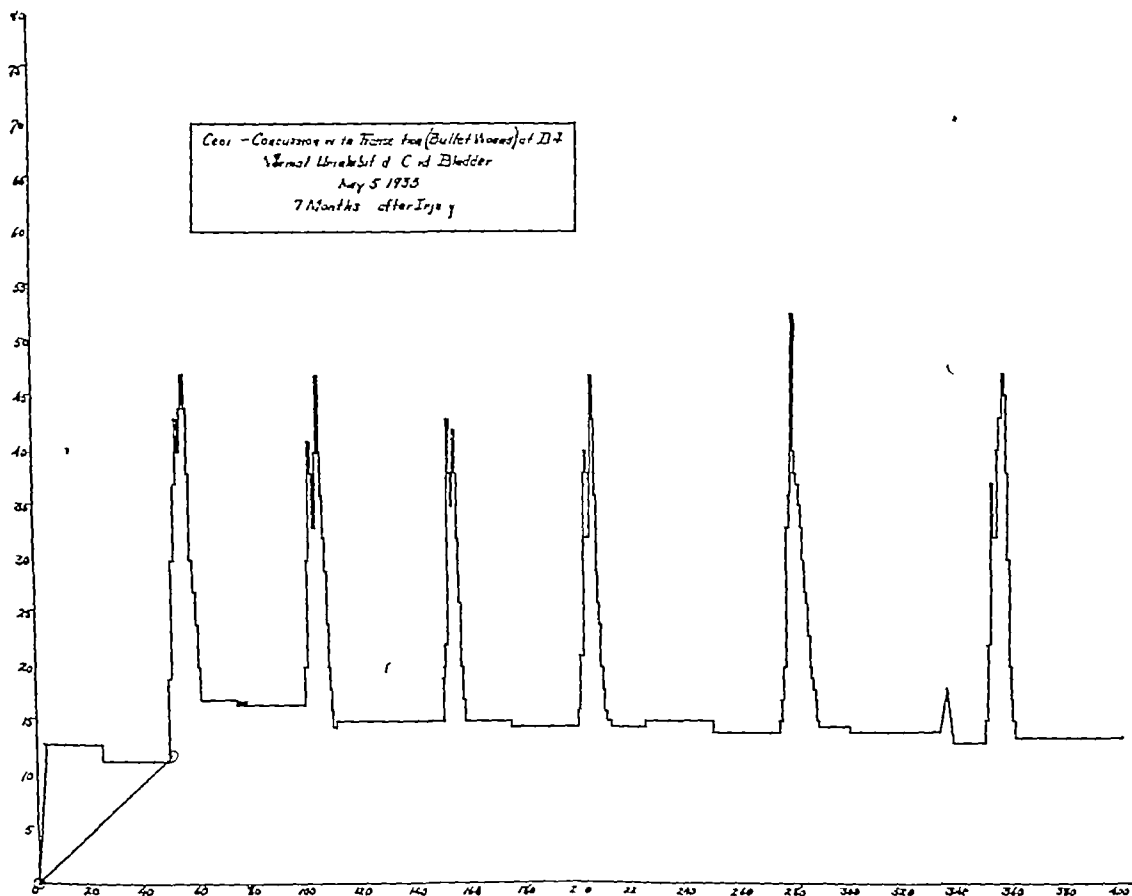


FIGURE 7

the sustained tonus falls to slightly below the starting level. Emptying contractions are constantly present and there is an average 'residual' of only 6 per cent of the fill. The storage capacity is below 200 cc in 90 per cent of the cases. Since no inhibitory impulses reach the bladder the emptying contractions are remarkably rhythmic and regular in occurrence. The external sphincteric activity is reflexly normal but is not under voluntary control. Treatment is based on the use of a retention catheter. This is opened by the patient at intervals during the day and is attached to a tidal drainage apparatus<sup>2</sup> at night. This catheter, just as in all the other types of cases treated by tidal drainage, is removed, cleaned and replaced once a week. The length of the interval during which the catheter is shut off and the bladder allowed to fill is determined by experiment and varies with each patient. It will be influenced by the

*The Normal Cord Bladder* (figure 8). In all other types of cord injury this uninhibited cord bladder goes on to a stage that differs from normal only cystometrically. The ability to inhibit emptying contractions is gradually regained and, subjectively, control of micturition is again complete. This requires a period of re-education, however, and treatment must be directed with that end in view. As a first step the bladder is drained at regular increasingly prolonged intervals. In this way the storage capacity will be increased and normal inhibitory impulses will be stimulated. In addition, whenever emptying is permitted, the catheter is only opened part way and the patient is made to expel his urine actively against a positive pressure. This serves as a further aid in helping him regain normal control of micturition. If possible these procedures are carried out with the patient in the upright position. Tidal drain-

age<sup>3</sup> is used at first only at night and then dispensed with entirely. As soon as the patient can go three hours between emptying periods without leakage and provided he can of his own action completely empty his bladder against positive pressure the catheter is removed. A further interval of training along the above lines follows with the idea that full nocturnal

the normal. The storage capacity is definitely greater in the normal bladder.

*Summary of Types of Cord Bladder (figure 9)* The data detailed above have been collected from a group of twenty-four cases of all types of cord injuries exclusive of those in whom total denervation of the bladder due to destructive sacral or cauda equinal lesions was present.

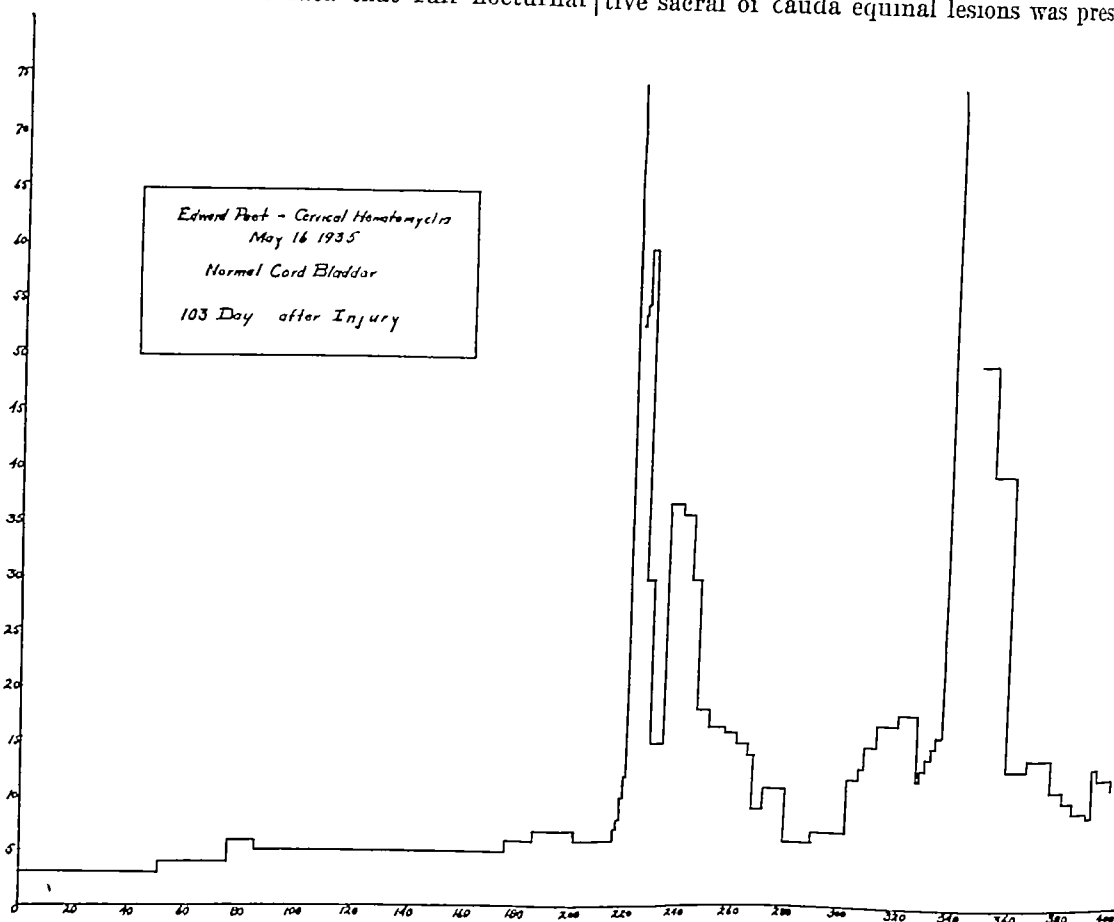


FIGURE 8

control and adequate day control shall be considered normal.

Kidney function measured by intravenous pyelogram, phenolsulphonephthalein test, a retrograde pyelogram following cystoscopy, and repeated chemical and cytological examinations of the urine have proved to be normal in all such cases. Cystometrically, however, there still appears a variation from normal (figure 4). The initial tonus is slightly higher than normal. The sustained tonus rises only 1 cm. as compared with a normal  $3\frac{1}{2}$  cm. in 400 cc. of fill. Emptying contractions may or may not be present in the normal bladder with this fill but are always present when 400 cc. is put into the normal cord bladder. Also, in the latter, residual urine is present to the extent of 16 per cent of the fill as opposed to a complete absence in

Thirteen were followed to their end point. Five wound up with an uninhibited cord bladder, all being dorsal transections. Their end points were reached at seventeen months, twenty and a half months, twenty-five months, four years, and seventeen years after injury. The first three were seen and cared for from the start. Of the other two, one was first seen one year and the other seventeen years after injury. The only patients of these five to have abnormal genito-urinary tracts were these last two. The more recent had a severe pyelonephrosis which eventually proved fatal and the other a chronic cystitis which is at present under treatment. Out of the remaining three one died of septicemia about one and one half years after injury, with proof at autopsy that his genito-urinary tract was normal and that the septicemia was due

to a septic hip joint and psoas abscess. The other two are living, one at home in a wheel chair and the other in the hospital on his way to a wheel chair existence. Both have been demonstrated to have normal anatomical and functioning kidneys, ureters and bladders by all the usual forms of genito-urinary tract examinations.

Eight other patients had subjectively normal bladders at discharge. Their neurologic damage included five cervical hematomyelias, one cervical edema and two compressed cauda

group of twenty-four, nine died from their cord injuries. In these it was possible to demonstrate before death the presence of an atonic bladder alone in four, an autonomous bladder alone in one, an atonic followed by an autonomous bladder in one and autonomous followed by a hypertonic bladder in two, and a hypertonic bladder alone in one. The other two cases are still under treatment for hypertonic bladders. This condition was present on their admission and dates back to injuries sustained nine and eighteen years previously.

Type of Injury	Site of Injury	Atonic Cord Bladder	Autonomous Cord Bladder	Hypertonic Cord Bladder	Normal Uninhibited Cord Bladder	Normal Cord Bladder	Interval Between Onset and Date of Death or Discharge
Transection	Cervical	1					24 hours
Transection	Cervical	1					7 hours
Transection	Cervical	1					5 days
Transection	Dorsal				1		17 months
Transection	Dorsal		1		1		20 months
Transection	Dorsal			1	1		4 years
Transection	Dorsal				1		2 years
Transection	Dorsal				1		17 years
Hematomyelia	Cervical		1				29 days
Hematomyelia	Cervical					1	4½ months
Hematomyelia	Cervical					1	20 days
Hematomyelia	Cervical	1	1				31 days
Hematomyelia	Cervical	1		1		1	4 months
Hematomyelia	Cervical	1					14 hours
Hematomyelia	Cervical	1	1			1	6 months
Edema	Cervical					1	24 hours
Hematomyelia	Cervical		1	1		1	3 months
Contusion	Dorsal			1			3 days
Compression	Cauda		1	1			18 days
Compression	Cauda		1	1		1	23 days
Compression	Cauda					1	3½ months
Compression	Cauda		1	1			3 months
Compression ?	Cauda		1	1			9 years
	Sacral			1			18 years
Totals		7	9	9	5	8	

FIGURE 3  
Distribution of Types of Cord Bladders

equinae. They have all been proved by cystometric and other types of genito-urinary examination to have normal cord bladders. This end point was reached four and one-half months, twenty days, four months, six months, twenty-four hours, three months, four months and three months after onset. All were seen at once on receipt of injury except one of the cauda equina cases which was first seen at three months and one of the cervical cases which was first seen at three weeks. One patient showed successively an atonic, hypertonic and then normal cord bladder, one an atonic, autonomous and normal, and two an autonomous, hypertonic and normal cord bladder in the course of their recovery. Three had normal cord bladders at the first examination. All are now living and active with varying degrees of neuromuscular disability.

Of the eleven cases remaining from the whole

*Treatment.* In the course of treating these bladders with tidal drainage,<sup>3</sup> certain data having to do more particularly with the technical aspects have become evident. Perhaps the most important is that with this method of treatment the problem of nursing these patients has been simplified to an astonishing degree. If the apparatus is properly adjusted to the type of bladder that is involved these patients should never be wet. In this series, decubitus ulcerations have occurred only four times despite the fact that all the patients except two were kept on ordinary mattresses supplemented in perhaps one-half of the cases by rubber air rings or lamb's wool skins. Three of these four were wet in contradistinction to the other twenty-one who were consistently dry. In one this was due to the patient's persistently removing his catheter and in one because the tidal drainage was set for an autonomous bladder when

actually the bladder was hypertonic. As a result there was leakage about the catheter. Another had treatment carried out by an early and inefficient apparatus. In the last the decubitus ulcer was already present before he came into my care and did not heal before death in spite of being kept dry. This ability to keep the patients' backs dry and therefore in good condition has proved valuable in other instances also. For example, in a child of nine with *Streptococcus hemolyticus* meningitis from a compound fracture of the skull, it was necessary to do a lumbar puncture every four hours. During the first week of treatment and while the patient urinated into the bed, every puncture wound became a small abscess. For the next four weeks his back remained dry. During this time he was on tidal drainage. Under these latter conditions, one hundred and thirty-four

the internal diameters of the various tubing must be of the sizes specified and the preserve jar reservoir must be set at such a level that the horizontal arms of the T tubes come 20 cm below the bladder level. Intravesical pressure must be maintained at the level proper for each different type of bladder, varying from the 2 to 5 cm of the atonic bladder to the 20 to 30 cm of the hypertonic bladder. The rubber flutter valve must be inserted just below the dropper in all instances in which the bladder is hypertonic. The apparatus will not work properly, regardless of appearances, unless these requirements are met and, only then, if respiratory waves are constantly visible in the air vent or manometer tubing, if the preserve jar empties completely at each cycle and if the siphon effect is broken by the entrance of air only through the air vent or manometer tubing.

Type of Treatment	Totals	Genito-Urinary Tract Infection Incidental to Treatment	From Technical Errors	Present Before Being Seen	Final % of G U Tract Infection
Without Tidal Drainage	33	24			73%
No Urine Examination	16				
With Tidal Drainage	26	4	2	1	15%

FIGURE 10  
End Result Chart

lumbar punctures were done and no sepsis of any kind developed in any of the wounds.

There are also certain unfavorable complications that have arisen from the use of this apparatus. The most important have to do with the catheterization of male patients. Two periurethral abscesses from ruptured urethras have occurred. These resulted directly from attempts at catheterization with stiletted catheters. This was possible because of the anesthesia due to the cord lesion, but is an inexcusable complication. Acute epididymitis has also occurred. It has always subsided with withdrawal of the catheter until the temperature and tenderness have disappeared. Because these complications could be traced in each instance to the use of too large a catheter—sizes even up to 29 F having been used—I have not considered it necessary to tie the vas in any case. The oversized catheter was always used in an attempt to prevent leakage about it. This failed in every case until the constantly present but unrecognized maladjustment of the tidal drainage apparatus to the type of bladder being treated had been put right. I have found no contraindications to the intelligent use of this apparatus. However, failure will follow if variations from the standard set up are permitted. The catheter must be a rectal tube, the irrigator must be at least 30 cm above the glass dropper which, in its turn, must be higher than the apex of the siphon curve,

**Results (figure 10)** In the past six years, seventy-five spinal cord injuries have been admitted to the neurosurgical service of the Boston City Hospital. These have been divided as follows: forty-six cervical, twenty-one thoracic and eight lumbosacral or cauda equina. In addition there have been eighteen suspected cord injuries in patients who, on investigation, proved to be suffering from bony damage only. Of the seventy-five, sixteen have been eliminated from this end-result study because no urinary examinations were available. Thirty-three were seen before tidal drainage was in use. In this group all the usual other types of treatment as applied to the bladder were tried. They included constant and interrupted catheter drainage, complete absence of any drainage of any type and suprapubic cystostomy. Urinary infection was considered present when clumps of white blood cells were seen in microscopic examination of the urine just before the patient's death or discharge or when such infection was found at autopsy. Under these conditions urinary tract infection was present in 73 per cent. There are twenty-six cases in the more recent group. These have all been treated either in whole or in part by tidal drainage. The same diagnostic standards as given above were used in determining the presence of genito-urinary tract infection. In addition three cases were excluded—one which not only entered with but was dis-

charged with cystitis, and two others that developed periurethral abscesses after improper catheterization. Under these conditions and with the only significant change a shift from the older methods of treatment to tidal drainage, the incidence of urinary infection dropped to 15 per cent.

### Conclusions

1 For purposes of diagnosis, prognosis and treatment, "cord bladders" resulting from all types of spinal cord injuries should be divided into four distinct groups.

2 These may be measured cystometrically against normal bladder activity in terms of initial and sustained tonus, presence and periodicity of emptying contractions, the absolute amount of residual urine expressed in terms of percentage of fill the storage capacity of the bladder and the reflex and voluntary sphincteric activity.

3 With these criteria, "cord bladders" are atonic, autonomous, hypertonic and normal.

4 The only permissible end-result of any "cord bladder" that results from spinal cord injury is either an uninhibited cord bladder in cases of spinal cord transection above the sacral segments, an autonomous cord bladder in cases of destructive lesions of the sacral segments or cauda equina, or a normal cord bladder in all other spinal cord injuries.

5 All types of cord bladder are amenable to treatment by tidal drainage provided the apparatus is adjusted to suit the type of bladder being treated.

6 Except for complications due to misuse of the apparatus, tidal drainage as a method of treatment of cord bladders of any type has no contraindications.

7 Indwelling urethral rectal tubes used as catheters, or mushroom catheters, may be employed indefinitely in conjunction with tidal drainage in either male or female urethras without producing cystitis or urethritis. They must be removed, cleaned, and replaced once a week and care must be taken to avoid the use of too large sizes.

8 The incidence of decubitus ulcerations is greatly reduced and the problem of nursing the patient with a spinal cord injury is greatly simplified if the patient is kept dry by the proper use of tidal drainage.

9 The incidence of all types of urinary tract sepsis in spinal cord injuries has been reduced from 73 per cent in thirty-five cases to 15 per cent in twenty-six cases through the prompt, intelligent and routine use of tidal drainage in the care of the bladder.

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### DISCUSSION

CHAIRMAN HAYDEN. The discussion will be opened by Dr James A Seaman of Springfield.

DR JAMES A SEAMAN. Springfield. *Mr Chairman and Fellows of the Society*—It is a very great privilege indeed to discuss such a very fascinating paper as Dr Munro has presented to you this morning. One is naturally impressed with the outstanding contribution which he has made in the diagnosis and treatment of cord bladders due to cord injury—and please note that the treatment is original. It is quite likely that none of us have been impressed with the former methods of handling these cases—allowing the bladder to fill and overflow leaving the patient constantly in a puddle with its attending bedsores and difficult nursing problems. Even supra pubic drainage and the catheter and clamp now seem as outmoded as the Model T Ford. But these methods did not attempt to determine the type of bladder with which one is dealing. The classification of cord bladders is tremendously important. It is quite necessary to know whether one is dealing with an atonic cord bladder, autonomous bladder or a hypertonic cord bladder, a normal cord bladder or an uninhibited normal cord bladder. Intelligent treatment can be based only upon a knowledge of these facts. Strictly speaking these bladders should have cystometric readings done on them. To all intents and purposes the apparatus itself is a great aid in determining the type of bladder. Each type mentioned requires a different adjustment for allowing bladder pressure.

This apparatus Dr Munro has shown to you seems quite involved but is in reality quite simple utilizing, very effectively, a few fundamental hydraulic principles such as the introduction into the system of a small reservoir equipped with an air vent which receives irrigating fluids as they drop from the container also the scheme to have the siphon come off between the reservoirs and the bladder and again the provision of tubing through which the bladder empties with a diameter at all points at least twice that of the tubing which empties into the reservoir. The alternate filling and emptying again by siphonage and gravity follow automatically with the set up. It is really ingenious. It handles the problem of residual urine as no other method does. I do hope that, in his closing, Dr Munro will throw on a slide and explain to you a little more in detail just how this apparatus works.

For a long period the indwelling catheter—the bête noir of the urologist—has been a problem. The author quite properly recognizes the importance of the toilet of the urethra in the prophylaxis against complication. Even with this prophylaxis however epididymitis and urethritis are bound to occur because these spinal injuries do not usually occur with aseptic prostates, bladders and urethras. There will always be a large number with chronic prostatitis in which an indwelling catheter for a long period of time is going to be a menace. Possibly this can

actually the bladder was hypertonic. As a result there was leakage about the catheter. Another had treatment carried out by an early and inefficient apparatus. In the last the decubitus ulcer was already present before he came into my care and did not heal before death in spite of being kept dry. This ability to keep the patients' backs dry and therefore in good condition has proved valuable in other instances also. For example, in a child of nine with *Streptococcus hemolyticus* meningitis from a compound fracture of the skull, it was necessary to do a lumbar puncture every four hours. During the first week of treatment and while the patient urinated into the bed, every puncture wound became a small abscess. For the next four weeks his back remained dry. During this time he was on tidal drainage. Under these latter conditions, one hundred and thirty-four

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FIGURE 10  
End Result Chart

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There are also certain unfavorable complications that have arisen from the use of this apparatus. The most important have to do with the catheterization of male patients. Two perineal abscesses from ruptured urethras have occurred. These resulted directly from attempts at catheterization with stiletted catheters. This was possible because of the anesthesia due to the cord lesion, but is an inexcusable complication. Acute epididymitis has also occurred. It has always subsided with withdrawal of the catheter until the temperature and tenderness have disappeared. Because these complications could be traced in each instance to the use of too large a catheter—sizes even up to 29 F. having been used—I have not considered it necessary to tie the vas in any case. The oversized catheter was always used in an attempt to prevent leakage about it. This failed in every case until the constantly present but unrecognized maladjustment of the tidal drainage apparatus to the type of bladder being treated had been put right. I have found no contraindications to the intelligent use of this apparatus. However, failure will follow if variations from the standard set-up are permitted. The catheter must be a rectal tube, the irrigator must be at least 30 cm. above the glass dropper which, in its turn, must be higher than the apex of the siphon curve,

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due to destruction of the vesical sphincter following transurethral operations and in cases of spina bifida prior to any operative procedure for the relief of the same. With tidal drainage the urinary bladder in this type of case can be dilated and the infection in the bladder practically cleared up. With the contracted irritable bladder in renal tuberculosis providing that a resection of the presacral nerve is done prior to tidal drainage it offers the patient considerable relief from his marked frequency. I am sorry Dr. Munro did not have time to discuss this type of case in his paper.

I do not believe that tidal drainage has any place in the contracted malignant bladder. I have tried it out on several cases and cannot see that the bladder capacity has been in any way increased; furthermore, it causes a great deal of discomfort to the patient.

CHAIRMAN HAYDEN: I will now ask Dr. Munro to close the discussion.

DR. DONALD MUNRO: I have only one word to add in addition to thanking Dr. Seaman and Dr. Howard for their kindly discussion and comments.

In regard to Dr. Howard's question about epididymitis, I am obliged to report that we have had cases of epididymitis. This complication has been covered in the body of a paper, a portion of which I was forced to omit through lack of time. This has been due in every case to the use of too large a catheter.

I am perhaps going somewhat out of my proper field in making the following comment, but it is based on experience which has been convincing to me. The comment is that I believe the problem of residual urine to be synonymous with that of infection of the bladder. Any method of treatment

that will eliminate residual urine will also obviate the occurrence of cystitis. As a corollary to this, it appears plain to me that the use or nonuse of the catheter has little to do with the complication of bladder infection. In support of this I can report that, although the figures do not show in my paper, I have nevertheless had both male and female patients who have worn indwelling catheters for over two years without cystitis. This is in my opinion due only to the fact that residual urine was never allowed to collect. Thanks to the constant use of the tidal drainage apparatus.

CHAIRMAN HAYDEN: Is the Nominating Committee ready to report?

CHAIRMAN OF THE NOMINATING COMMITTEE: The Committee recommends the name of Dr. Frederick S. Hopkins of Springfield for Chairman of the Section and that of Dr. Augustus Thorndike, Jr. of Boston, for Secretary.

CHAIRMAN HAYDEN: Are there any further nominations? If not, I will ask the Secretary to cast one ballot for the election of the officers as read.

(The Secretary cast ballot for the election of officers for the coming year.)

We have been aware for many years of Dr. Truesdale's great interest in the subject of diaphragmatic hernia of his long continued conscientious work in behalf of those afflicted with this condition and of his efforts in creating interest in this subject throughout the country. I wrote Dr. Truesdale some time ago and asked him to present a paper on this subject, but he felt that he would prefer to discuss this paper of Dr. Joseph H. Marks of Fall River entitled "Roentgen Ray Findings in Diaphragmatic Hernia."

## ROENTGEN RAY FINDINGS IN DIAPHRAGMATIC HERNIA\*

BY JOSEPH H. MARKS, M.D.

Mr. Chairman, Members of the Massachusetts Medical Society—

I AM sincerely grateful to Dr. Hayden for the invitation to come before you this morning. Although I am, relatively speaking, an amateur in the field, I thought perhaps it might be of interest to review briefly with you the entire subject of diaphragmatic hernia and associated conditions as seen by the roentgenologist. All of the cases which I will show you have been seen at the Truesdale Hospital within the last three years and a number of them have already been reported by Dr. Truesdale.<sup>1</sup>

Without attempting to go into the literature on the subject of diaphragmatic hernia it is of

interest to note that in 1912 only 15 of the 650 cases collected by Giffin<sup>2</sup> had been diagnosed during life. Even as late as 1923 Pancoast and Boles<sup>3</sup> were able to find only 47 cases so diagnosed. Unfortunately the large number of papers which have appeared during recent years has not served definitely to clarify the problem. The most recent case seen in our hospital was examined by numerous physicians in several of the more prominent medical centers in this country and the diagnosis was missed in spite of a clear cut history of adequate trauma and in spite of a flat film of the chest showing a large gas bubble just above the left diaphragm. The diagnosis in the case of this woman was finally made by Dr. Walter Jones of Providence and was confirmed by x-ray examination by Dr. James T. Boyd.

The study of the problem of diaphragmatic hernia and the recognition of the fact that it is not a rare condition have brought it to the attention of all who are concerned with the

\*Read at the Annual Meeting of the Massachusetts Medical Society, Section of Surgery, Springfield, June 3, 1935.

This paper is a synopsis of a more complete discussion of the subject which will appear in an early issue of *The American Journal of Roentgenology and Radium Therapy*, under the title "Diaphragmatic Hernia and Associated Conditions."

<sup>1</sup>Marks, Joseph H.—Roentgenologist, Truesdale Hospital, Fall River. For record and address of author see *This Week's Issue*, page 790.

be obviated somewhat more by using the new Wappler catheters, particularly the one made by Hatch which has a little tube running down the side for the instillation of medication in the deep urethra for prophylaxis against complications. I see no reason for doing a vasoligation on these patients. Very often the ligation of a vas in itself causes an epididymitis, particularly where there is a certain amount of vasitis existing. One important thing is to keep the catheter in place without moving and I think this little technicality can be pretty well handled by the proper taping of the catheter to the shaft of the penis and running the tape up the groin. It absolutely prevents any manipulation of the tubing or the catheter being pulled by the patient and being dislodged.

A number of these patients will have, to begin with, a chronic prostatitis, a fibrosed bladder neck or prostate, a diverticulum or some complication of the lower or upper urological tract. They will have to be dealt with before the end result will be thoroughly satisfactory. Cystoscopy early in the condition will help to determine these facts. There should be no hesitancy in doing a cystoscopic examination. Under the proper aseptic technic there should be no fear whatever. Intravenous urography can be utilized.

The essential thing is to institute tidal drainage at the earliest possible moment, before severe infection develops. Drainage should be started early in the state of final shock. Irrigating fluids may be a weak potassium permanganate solution, sterile water or whatever you will. The system permits easy medication of the bladder and I am thoroughly convinced that it keeps the bladder clean by the continual lavage. One should be sure that the ureteral orifices are not relaxed, thus permitting back flow up to the kidneys.

The bladder is supplied by three sets of nerves—the sympathetic (hypogastric) nerves, the parasympathetic (pelvic) nerves and the somatic (pudic) nerves.

Our knowledge concerning the sympathetic pathway is incomplete. Probably it connects with the spinal cord between the second dorsal and the third lumbar spinal segments, inclusive. Physiologically the sympathetic pathway controls the mechanism of bladder filling, since its stimulation causes the contraction of the sphincter (trigonal) area and inhibition of the detrusor muscle.

The parasympathetic nerves are connected chiefly with the second and third sacral nerves. They control the mechanism of bladder emptying, since their stimulation produces increased tonus of the detrusor muscle and inhibition of the vesical sphincter.

The somatic nerve arises from the third and fourth sacral segments and represents the voluntary aspect of micturition. The nerve supplies the external sphincter and the deep urethral area. The two autonomic pathways carry impulses which produce antagonistic effects. To be sure this has been questioned by some investigators. The pathologic physiology of most neurogenic disorders of the bladder is essentially a loss to the fine balance existing between the two mechanisms. Apparently this method of tidal drainage is an effort to correct this imbalance until recovery can take place.

In the tabetic bladder the pathology is different. Here both sensory and motor (parasympathetic) pathways are involved and a parasympathetic stimulation with a drug like mechoylol is ineffective. A sympathetic inhibitor such as ergotamine might be used to overcome the sphincteric block, but there is always the danger of ergot poisoning in cases

so treated. It would be interesting to know if Dr. Munro has used any of these sympathetic or parasympathetic stimulants effectively.

In some of these bladders that are incapable of emptying completely as a result of injury to any portion of the parasympathetic pathway from traumatic myelitis, spinal bifida or cord tumors, it would seem reasonable to suppose that the intact sympathetic contribution to vesical innervation would prove too effective a brake for the diseased parasympathetic innervation and that a presacral neurectomy—since the sympathetic system supplies the motor nerves of the sphincter and muscle—would balance the stimuli of emptying with those of urinary retention.

In my humble opinion this new apparatus offers great possibilities, and I do not believe its value has been as yet thoroughly evaluated. It is possible that it can be used more and more in other types of so-called medical bladders. I know it has proved its usefulness in tabetic bladders, in those of multiple sclerosis and in that other type of cord bladder of which we are hearing a little bit more recently, that is, the diabetic cord bladder. It seems as though it might also have an indication in those conditions following prostatectomy where the bladder has contracted down considerably, to train the bladder to hold more and more and to overcome the frequency during the few months following prostatectomy. Dr. Munro has said its chief function is in the cord bladders due to cord injury. It would seem that everybody who is likely to run into this type of injury—the general surgeon, the orthopedist and the medical man—would gain considerably by familiarizing himself with its technic. The one bugbear of these conditions the complications, can be avoided, so that the patient may be left with the best possible type of bladder, the normal cord bladder.

CHAIRMAN HAYDEN: The paper is open for general discussion.

DR. HERBERT H. HOWARD, Boston: Dr. Munro's tidal drainage apparatus fulfills a long felt want at the Boston City Hospital. Not only the general surgeons, but the members of the Neurosurgical Service prior to the time this apparatus was put into use threw up their hands at all of these cases because they remained in the ward for weeks and weeks, many of them developing an ascending pyelitis and some of them never leaving the hospital, not on account of the injury to the cord but on account of infection in the genito-urinary tract. Strangely enough I have never seen any cases complicated by an epididymitis following their being put on drainage and if Dr. Munro has had any such complications it has been without my knowledge. All I can say is that on the Urological Service we have not had any such complications.

Tidal drainage is not only of great value in cord lesions but I believe that it has a distinct place in urology. For the past year and a half we have found it very successful in the preoperative treatment of cases of prostatic obstruction where there has been a reflux in one or both ureters causing either a unilateral or bilateral pyelitis. In this type of case the patients have been put on tidal drainage over a period of from one to three weeks and in every single instance the infection in the kidneys has either entirely cleared up or has been greatly diminished so that they have been made perfectly good operative risks. We have used in these cases, acriflavine rather than boric acid solution or potassium permanganate.

This method is also of great value in cases of incontinence with small contracted dirty bladders.



of these cases, but it is an added reason why this group should be separated from the much smaller number of cases included under the title of "thoracic stomach"

Most authors are agreed that surgery is of little or no benefit in these cases, although Harrington<sup>5</sup> in 1933 reported four cases in which he sutured the diaphragm above the stomach following phrenicotomy. Other surgeons who have attempted to operate on this condition have found that the esophagus could be stretched sufficiently to bring the stomach down below the diaphragm but that it could not be held in that position.

#### HIATUS HERNIA

The hiatus hernia is by all odds the most common type of hernia through the diaphragm and is usually found in women over forty years of age who are overweight. Of the seventeen cases in this series all but two were women. The youngest was 38 years of age and the average age of the group was 51 years.

Hiatus hernias are true hernias in the sense that they are invested by a serous sac. They are also true hernias in the sense that the stomach was once in its normal position below the diaphragm. In this latter regard the two previous groups of cases are not true hernias. The esophagus is of normal length but its point of entrance into the stomach may be above the diaphragm due to tortuosity, as mentioned above.

It must be remembered that in most cases of the hiatus type the hernia is not present when the patient is in the erect position. It is usually best seen and most nearly filled in the supine or Trendelenburg position and with the right chest slightly forward. If the hernia is present in the erect position it is indicative of adhesions. In the present series of seventeen cases the hernia was visualized as a gas bubble above the diaphragm in four cases even before barium was given.

#### CONGENITAL HERNIA

Congenital hernias are, in many respects, the most interesting of all the diaphragmatic hernias. It is in this group that we find the greatest departure from the normal as well as variation in the organs involved and variation in the site of herniation. They are often dramatic in their clinical course and they are frequently the cause of death by asphyxia or intestinal obstruction. Their symptomatology is often related more closely to the respiratory system than to the alimentary tract by reason of the displacement of the mediastinum and compression of the lung.

The great majority are found on the left side and occur through a persistent foramen of Bochdalek. Less commonly they occur

through the parasternal foramen of Morgagni and still less commonly through defects in other parts of the diaphragm. A few have been reported in which the hernia occurred on the right side and included only a portion of the liver.

The common type occurring through the left foramen of Bochdalek frequently includes both the large and small intestines, the stomach, spleen, omentum, left lobe of the liver and, occasionally, other organs. Those occurring anteriorly usually involve only the large and small bowel and the omentum.

Due to the fact that the entire left chest may be filled with abdominal organs and to the fact that loops of bowel may be seen entering and leaving the chest over a rather wide area, the roentgenologist may be led to wonder whether sufficient diaphragm remains for satisfactory repair or whether the case may be one of congenital absence of the diaphragm. Careful studies in all positions at frequent intervals after the ingestion of barium and after barium by enema will usually give indirect evidence of a shelf-like structure pressing against some of the loops as they pass from one cavity into the other. In searching for evidence of such remnants of the diaphragm, it must be remembered that the diaphragm is frequently depressed by the herniated organs above it. Evidence of a sac, if present, may be shown by a thin line of slightly increased density which appears to gather the loops of bowel together into a space somewhat smaller than the thoracic cage.

#### TRAUMATIC HERNIA

Traumatic hernias may occur in children or adults and are always false hernias. Interesting statistics regarding the incidence of traumatic hernia have been collected by Hedblom.<sup>6</sup> He found that approximately 90 per cent occurred in males and that about 50 per cent were due to penetrating injuries. Of those due to nonpenetrating injuries only 23 per cent were due to crushing while 36 per cent were due to falls. The possibility of hernia should, therefore, be carefully considered in the examination of all persons who have suffered severe injury due to falling.

Traumatic hernia may occur through any part of the diaphragm but 95 per cent are found on the left side. The tear in the diaphragm usually runs radially from the central tendon and frequently extends from the dome to the periphery. The tendency of the opening to extend the full length of the muscle fibers makes it similar to that of congenital origin, and the number and variety of the organs involved are also frequently similar. A point of difference between the extensive traumatic hernias and the congenital hernias is that in the traumatic group the cecum is fixed in its

disorders of the gastrointestinal and respiratory systems. Both the internist and the surgeon have come to include it in their differential diagnoses, but the roentgenologist is the one on whom the major portion of the responsibility rests in establishing the diagnosis in most cases. It is quite proper, therefore, that the roentgenologist should have a very keen interest in the problem. If his examination is made with care and with a knowledge of the various types of hernia which may occur, his opinion may be of invaluable assistance in directing the proper course of treatment for the patient.

The muscular portion of the diaphragm is divided into three main parts and each part is named according to its site of origin. The pars sternalis arises from the posterior surface of the xiphoid process, the pars costalis from the costal cartilages of the six lower ribs and the pars lumbalis from the medial and lateral lumbocostal arches. The foramen of Bochdalek is the opening which is found posterolaterally if there is failure of fusion of the pars costalis and the pars lumbalis. Similarly the foramen of Morgagni is found anteriorly when there is failure of fusion of the pars costalis with the pars sternalis.

It should be noted that there is no sharp line of demarcation between the normal and the abnormal as regards the fusion or failure of fusion of these several segments of the muscular portion of the diaphragm. Even in the normal adult there is often a triangular space which separates the muscle fibers of the posterior and lateral segments. This space is filled by a thin layer of connective tissue which is covered above and below by pleura and peritoneum, respectively. This layer of connective tissue is much less elastic, and hence more easily torn, than the surrounding muscle, and that it is not more frequently the site of hernia is probably due to the fact that the area is protected by the liver and by the fatty tissues surrounding the adrenal gland and the upper pole of the kidney. That the protection offered by the liver is a very real thing is shown by the fact that, even in traumatic cases, 95 per cent occur on the left side.

#### THORACIC STOMACH

There are only four cases in the literature which definitely belong in the group of true thoracic stomachs and which have all of the findings described by Bailey<sup>4</sup> when he gave the name. It is unfortunate that the literature contains many reports of so called "thoracic stomach" that upon closer examination prove to be nothing more than the very common type of hiatus hernia in which a relatively large portion of the stomach has been found above the diaphragm. The true thoracic

stomach is an anatomic variant which cannot be corrected by any surgical procedure, whereas the hiatus hernia is an acquired lesion which may be repaired if the symptoms warrant.

#### DIAPHRAGMATIC HERNIA WITH SHORT ESOPHAGUS

The group included under the title of diaphragmatic hernia with short esophagus is of considerable interest although it has been well recognized for only about 5 or 6 years. It is important that this group should be recognized and clearly defined, since the shortened esophagus prevents surgical repair of the hernia. The preoperative differentiation of this group and the much larger group of hiatus hernias can be made only by the roentgenologist or the endoscopist, and it is, therefore, of particular importance that the roentgenologist should make a careful study of the esophagus in all cases of hernia through the diaphragm.

In the patient having a diaphragmatic hernia with a short esophagus, the esophagus passes downward through the posterior mediastinum in an almost straight line and enters the displaced stomach in its uppermost part. Instead of the usual rounded fundus the upper end of the stomach, in these cases, is frequently more or less conical or may have the appearance of a dilated portion of the esophagus. In the hiatus hernia, on the other hand, the termination of the esophagus is frequently above the diaphragm, but a careful study will show that this high point of termination is due to tortuosity and not to shortening. It will also be noted that, in cases of hiatus hernia, the fundus of the stomach has the same smoothly rounded contour as that normally seen below the diaphragm and, further, that the point of entrance of the esophagus into the stomach is slightly to one side rather than at the apex.

If the esophagus is short, the stomach must of necessity remain at least in part within the chest at all times. Hence, in cases of this type, the displacement of the stomach should be visualized even when the patient stands erect, although it may not be possible to fill completely the intrathoracic portion of the stomach in this position. Careful observation of the first few swallows of barium will, in many cases, serve to differentiate this condition and hiatus hernia, since in the latter condition the hernia is frequently present only when the patient is in the horizontal or Trendelenburg position. Hiatus hernias may be visualized in the erect position only if they are large or are adherent to the surrounding structures.

It is of interest that in all of the reported cases of hernia with a short esophagus the junction of the esophagus with the stomach is at the level of the seventh or eighth thoracic vertebra. It is not yet clear why the short esophagus should be so nearly the same length in all

comprehensively described first by the roentgenologist and of course, by the work of the surgeon and most of the literature has been contributed by these two. The medical man has been rather slow in taking part in the subject although he usually sees these cases first. As Dr Truesdale has pointed out, many branches of medicine come in contact with the handling of these cases but I feel that Dr Truesdale has omitted one branch of medicine hematology. In many of these cases the presence of an unexplained secondary anemia may be the only symptom to attract the attention of the clinician. The anemia in these cases is due to mild but frequent hemorrhage from erosions of the esophageal or gastric mucous membrane, caused by mechanical injury to the stomach because of its unnatural situation or by some interference with its blood supply caused by the stricture at the esophageal orifice especially during attacks of vomiting or severe coughing. These erosions sometimes progress to actual ulcerations and occasionally to carcinoma.

The cases of diaphragmatic hernia in which I am particularly interested as a gastro-enterologist are of the esophageal orifice type which often present a complex symptomatology and are the most commonly seen. Coming from a neighboring city of Dr Truesdale I have been doubly interested in this subject and during a period of 12 years I have encountered 55 cases of this type of hernia. An incidence of 1 to 113 cases observed. I have a few slides I would like to show you of some of the cases I have handled which will bring out some interesting points

(Slide) This is an esophageal-diaphragmatic hernia with herniation of about one-third of the stomach through the esophageal orifice encroaching on the lower portion of the esophagus and displacing the heart to the right. Previous diagnosis of gallbladder and heart disease, and esophageal carcinoma had been made.

(Slide) This is a diaphragmatic hernia, paraesophageal type with herniation of about one-third of the stomach through the esophageal hiatus. With the patient lying down on the left side, the hernia is seen in the posterior mediastinum encroaching on the heart. Previous diagnosis of heart disease had been made in this case.

(Slide) This is a diaphragmatic hernia and cancer of the fundus of the stomach, with herniation of about one-third of the stomach through the esophageal hiatus associated with intermittent attacks of intestinal obstruction, hematemesis, and marked anemia. Previous diagnosis of pernicious anemia and carcinoma of the colon had been made.

(Slide) This is a diaphragmatic hernia and carcinoma of the cardia originating at the site of an ulcer within the herniated portion of the stomach. This case has been observed over a period of four years.

CHAIRMAN HAYDEN: Dr Marks will you close the discussion?

DR. MARKS: I have nothing further to add.

(Section adjourned.)

## UNDULANT FEVER\*

### An Usual Case With Necropsy

BY JACQUES S. GOTTLIEB, M.D.

WITH the recognition by Bruce in 1887<sup>1</sup> of the specific organism, undulant or Malta fever became recognized as a distinct disease entity. Clinically, however, this disease had been described under a variety of names throughout Europe, Africa and Asia even dating back to the epidemics of Hippocrates. The most common name was that of Malta fever, a result of study at one of the most highly infected areas. It was not until 1913 that the International Congress of Medicine agreed that the term *undulant fever*, because of the nature of the temperature curve, was the most satisfactory.

Interest in this disease in the United States was not aroused until cases of infection occurred among our soldiers after the Spanish American War. Slowly throughout the following years more and more cases have been recognized until at present practically every state has its reported cases and thus the disease assumes an endemic character. Because of this great potential danger, no other infection has at-

tracted wider interest from the bacteriologist and public health worker.

Because of the heterogeneity of the symptom complexes, the clinico-pathologic laboratory is of great assistance and is usually relied upon in establishing the diagnosis. The cultivation of one of the brucella group of organisms from the blood or urine and the blood agglutination and intradermal tests are the tests usually performed.

The following case, although conforming to the general symptomatology of the disease, illustrates that laboratory tests cannot be wholly relied upon for diagnosis but are useful only as adjuncts to the clinical picture. In addition, the postmortem examination revealed some rather unusual findings.

A N., a twenty-nine year old married man weighing 193 pounds and measuring six feet tall entered the Hahnemann Hospital, Worcester on September 13, 1935 with the chief complaint of fever of about three weeks duration.

The present illness began with severe diffuse colicky pains in the upper abdomen three weeks before admission. He was slightly nauseated at that time. The physician who was called administered an opiate which relieved him temporarily. The following day he had a severe chill and his temperature was elevated to 105° F. He was then admitted to a nearby hospital where he remained for about one week. While there two Vidal tests were negative as were the bacteriologic examina-

Awarded the \$50.00 prize of the Massachusetts Medical Society, being the best case report submitted by an intern in one of the Massachusetts hospitals offering a rotating intern service.

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normal position in the right lower quadrant, whereas in those of congenital origin there is frequently an associated incomplete rotation of the colon so that the cecum and appendix are found in the left chest

#### EVENTRATION OF THE DIAPHRAGM

Eventration of the diaphragm may be congenital or acquired and is the result of aplasia or atrophy of the muscle fibers. It is a relatively rare condition if we exclude all cases due to operations on the phrenic nerves. It is more common on the left side than on the right and is also more common in males than in females. The diagnosis is of course dependent upon the demonstration of an elevated, but intact, diaphragm. Motion of the elevated diaphragm may be normal, diminished, absent or reversed. The differential diagnosis of eventration and hernia may be extremely difficult, but time does not permit a discussion of those difficulties here.

#### CONGENITAL ABSENCE OF THE DIAPHRAGM

Congenital absence of the diaphragm must always be included in the differential diagnosis of diaphragmatic hernia, although it is an extremely rare condition. There are only twelve cases reported in the literature and several of these are not definitely proved. It must be remembered that even so marked an anomaly as this is not incompatible with life and it should be borne in mind that the mammals are the only members of the animal kingdom which possess a diaphragm.

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#### DISCUSSION

CHAIRMAN HAYDEN: This paper will be discussed by Dr. Philemon E. Truesdale of Fall River.

DR. PHILEMON E. TRUESDALE, Fall River: *Members of the Section*—The paper which Dr. Marks has just read shows exceptionally fine work and an exceedingly good grasp of the entire subject of diaphragmatic hernia from his roentgenologic studies. In these cases the roentgenologist actually holds the key to the chamber of hope. Nothing can be done for the condition until a diagnosis has been established. Dr. Marks has concentrated on detail and in this way has furnished an inspiration to all the members of the staff, has their co-operative interest and has prompted further effort. It is surprising to note how many branches of

medical practice are involved in the care of patients with diaphragmatic hernia.

First, the embryologist is needed because of the genesis of diaphragmatic hernia. Shifting of organs during the developmental period furnishes embryologic data toward solving such problems as short esophagus and thoracic stomach. Dr. Bremer has said that embryology of the diaphragm is not well understood, at least not satisfactorily described in any book on the subject.

The anatomist helps determine the origin and distribution of the muscle fibers and the relation of the dome of the diaphragm to the ribs and other structures.

The physiologist makes clear the processes that occur as a result of altered digestion, circulation and respiration. We still have much to learn regarding the function of the esophagus, the cardia and the pillars of the diaphragm in the act of deglutition. We should like to know why a bolus of food swallowed is retarded slightly at the lower end of the esophagus before entering the stomach. The Germans call this point the loitering canal. The presence of a cardiac sphincter and of an esophageal diaphragmatic membrane are still moot questions.

The climatologist is needed to aid in differentiating cases of diaphragmatic hernia and those of tuberculosis so that diaphragmatic hernia will be discovered before patients are sent to sanatoria for the treatment of pulmonary tuberculosis.

The cardiologist is needed to study symptoms of diaphragmatic hernia simulating heart disease. Cardiac symptoms are often present especially in cases of the esophageal hiatus type. The greater the amount of gas in a hollow viscus above the diaphragm, the greater the mechanical pressure upon the heart. The symptoms from this encroachment on the heart may simulate angina pectoris.

Diaphragmatic hernia may complicate pregnancy. Rigler and Eneboe demonstrated hiatus hernia in 18 per cent of pregnant women during the third trimester, due to increased abdominal pressure.

The pediatrician usually discovers the congenital form of diaphragmatic hernia. He must be able to recognize the condition and determine the method of treatment. The first patient who came to me in 1921 had previously been examined by many clinicians. The correct diagnosis was not established until a pediatrician, Dr. Henry I. Bowditch, diagnosed the condition on clinical examination.

The gastroenterologist is often consulted for stomach and intestinal irregularities.

The esophagoscopist may be instrumental in discovering the variations at the cardia.

Successful outcome in operative cases is attributable partly to the anesthetist. In my own series of operative cases, I would like to say with reservation that the anesthetist usually carries the patient through the danger period.

Finally the surgeon is called upon in the discussion of treatment to be adopted.

Thus many special services are brought to bear upon the study and treatment of diaphragmatic hernia. The subject has opened many new fields for investigation.

I think that this paper by Dr. Marks demonstrates many points at issue. Scarcely two cases are alike and authorities such as von Bergmann, Knothe and Sauerbruch all hold different views nevertheless some of the associated problems have been solved while many others remain to be explained.

DR. SAMUEL MOREIN, Providence R. I.: I am very glad to have been able to hear this comprehensive paper of Dr. Marks and the discussion by Dr. Truesdale.

The subject of diaphragmatic hernia has been very

ligament of the liver This abscess contained approximately 5 cc of a thick, pale greenish grey fluid This abscess furrowed along the subdiaphragmatic space forming several small subdiaphragmatic abscesses There was also a tract leading to the inferior surface of the liver around the gallbladder where there was a walled off abscess containing approximately 50 cc of a thick, purulent exudate There were multiple small abscesses caught in between loops of small intestine and folds of the mesentery

On sectioning the liver, which was somewhat enlarged approximately one-half of the organ was made up of various sized abscesses filled with a similar exudate but somewhat bile-stained In addition there was found an acute toxic splenitis and mesenteric lymphadenitis

A heart's blood culture was taken which showed after an interval of time, gram-negative micrococci-like bacilli These were identified by cultural characteristics as *Brucella abortus*

This proved case of undulant fever is of particular interest for, although conforming in the main to the general symptomatology of the disease, there were several striking deviations which can be briefly emphasized

In the first place, this case showed quite definitely that the intermittent or undulatory type of temperature, after which the disease in fact is named, does not always occur Likewise, a leucopenia with a relative lymphocytosis need not always be present It is only of diagnostic significance when seen, for a leucocytosis does not by any means rule out undulant fever

Of more importance as laboratory aids are the specific agglutination, complement-fixation and intradermal tests M'Fadyean and Stockman,<sup>2</sup> Larson<sup>3</sup> and Huddleson,<sup>4</sup> who have exhaustively studied the serologic tests, all conclude that the complement-fixation test does not furnish so much information as the agglutination test Besides it occupies more time and attention, and has thus fallen into disuse The agglutination test which can be quickly and easily performed gives titres above 1:80 in the majority of positive cases It is not unusual for a case of undulant fever to have a low titre early in the course of the disease, often it takes several weeks for the agglutinins to demonstrate a definite increase It is, however, unusual for a case to persist as long as this one did without showing any more definite increase in titre than from 1:10 to 1:45 during a six weeks' interval and not increasing thereafter The intradermal test would seem to be a satisfactory one providing a suitable antigen is obtainable A positive test would indicate, just as does the tuberculin test, not only those who are actively infected but also those who have been infected previously with the brucella organism

The failure to obtain a positive blood culture during life was disappointing, but emphasizes

that difficulty Different varieties of the organism require different culture mediums, are slow to grow, while some are aerobic and others anaerobic In fact, some strains of the abortus variety even require a carbon-dioxide atmospheric content of 10 per cent for growth The fact that a growth was obtained at autopsy was indeed gratifying, for it definitely proved the infection in spite of the disappointing findings of the specific tests

Although the blood has been the most common source and gives the highest percentage of cultures from infected individuals, the urine and feces are also contaminated Shaw<sup>5</sup> has been able to find the organism in the urine in about 50 per cent of his cases Moreover, the organism can be found there for a long time—up to two years after convalescing Amoss and Poston<sup>6</sup> have succeeded in isolating the organism from the feces These facts definitely indicate that the urine and feces should be carefully disinfected to prevent spread For, although it is uncommon, cases have been reported where the mode of infection was through cuts and abrasions of the skin Thus, of course, is of importance from the viewpoint of care of the patient in the hospital

Pathologically, the subdiaphragmatic and hepatic abscesses found in this case are exceedingly rare Eyre and Fawcett<sup>7</sup> have reported the only comparable case In retrospect, it would thus seem that these lesions were probably responsible for the colicky abdominal pains the period of rather intense jaundice and, possibly, the leucocytosis

The remaining pathologic lesions, such as the acute toxic splenitis and mesenteric lymphadenitis, are the usual postmortem findings in this disease

This case, therefore, serves as an illustration of a disease with heterogeneous symptom complexes, which are oftentimes quite resistant to therapy particularly as we lack any specific remedy Moreover, as has been indicated, the laboratory tests cannot be wholly relied upon for diagnosis but are useful only as adjuncts to the clinical picture

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Case from service of E A Fisher M D Pathology through courtesy of William Freeman, M D

tions of the urine and feces for the typhoid organism

During this intervening period he had a daily irregular temperature preceded by a chill, following which he would perspire quite profusely. Occasionally he had dull pains in his upper abdomen. Gaseous eructations and an unpleasant taste in his mouth were almost constantly present. He was bothered by constipation. He had been drinking unpasteurized milk from a dairy which undoubtedly was contaminated with *Brucella abortus*, for the Massachusetts Department of Public Health authorities traced several other cases to the same source.

The past history was of some interest for he had had attacks of colicky pain in his upper abdomen which would last for three to four hours and would be followed by a dull ache. Occasionally he would vomit during one of these attacks. They occurred at irregular and infrequent intervals during the past four years. Other than that, the patient was a very well developed husky male who had never had any serious ailments. There was no history of any unusual activities during the months preceding his illness.

The family history was irrelevant. His parents and wife were living and in good health. No one with whom he was acquainted had any similar sickness.

The physical examination was conspicuous by the paucity of positive findings. On admission he did not appear to be particularly sick or in discomfort, although he was pale and appeared slightly anemic. There was no injection of the pharynx. The heart was not enlarged and the sounds were of good quality. The blood pressure was 118/72. The lungs were clear. The abdomen could not be adequately examined for he was extremely sensitive to touch.

The routine laboratory work on admission showed an essentially normal urine, except for an occasional granular or hyaline cast. The blood count showed a red blood cell count of 4,210,000 and a white blood cell count of 17,600 of which 89 per cent were polymorphonuclear leucocytes. During his stay special laboratory work was done for diagnosis which, however, was very disappointing. Several blood agglutination tests for organisms of the brucella group were done—the first soon after admission which was positive in a titer of 1:10, and the second about six weeks later which was positive in dilution of 1:45 and negative in 1:135. Blood cultures for the brucella organism were repeatedly unsuccessful. No allergic intradermal test was done because at that time we lacked suitable antigen. Other specific examinations as Widal tests, sputum examinations for tuberculosis and blood smears for malaria were repeatedly negative.

Blood counts and urine examinations were done at frequent intervals. On October 4 the red blood cell count had fallen to 2,930,000, a fairly severe anemia. On iron and liver therapy the count increased to 3,510,000 by October 25, three weeks later. However, in spite of continued large doses of iron and parenteral liver injections the red blood cell count gradually fell until it reached its low of 2,480,000 on December 13. At only one time was the white blood cell count below 10,000. On December 2 that count was 8,100 of which 5 per cent were polymorphonuclear leucocytes, the remainder being lymphocytes.

Toward the end of November bile began appearing in the urine and on December 2 the blood icteric index was 35.

During the patient's stay in the hospital his clinical course was progressively downward. He re-

mained 105 days before expiring on December 21, 1935—this made a total of 126 days for his illness. Entering as a large, well-developed man weighing about 200 pounds, not feeling particularly ill in spite of his high temperature, but worried he gradually changed slowly losing weight until he became quite thin—this in spite of a high caloric diet—his hair greyed and his cheeks became sunken.

His temperature was extremely erratic ranging from 99° to 106° F. The fluctuations were quite irregular. During the second third and fourth weeks he had numerous, severe chills lasting for about twenty minutes and followed by profuse perspiration. These chills varied in their frequency occurring as often as four a day, then lapsing two or three days before another would occur. On the whole the temperature averaged between 102° and 103° F. After October 13, for the remaining ten weeks, no chills occurred. At no time was there a steady undulatory swing to the temperature.

The pulse varied from around 90 to 140, averaging about 110 per minute. Respirations were as rapid as 40 per minute, but were usually within normal limits.

Early in his illness in the hospital he had several severe nosebleeds. In October, after developing a hacking cough, he produced some bloody sputum. At no time, however, could any abnormalities be heard in his chest. During the first week of October he developed paresthesia of the right hand which soon led to definite muscle weakness in the flexors and a demonstrable hypesthesia of the glove type. Atrophy of the flexors and intrinsic muscles of the hand—a peripheral neuritis—resulted in about a month.

Throughout his course in the hospital he had difficulty in sleeping and frequently had to have sedatives. Ofttimes he was confused and irrational at night. In October an abscess formed over the sacrum which was followed by a pressure necrosis. The area involved was about 6 cm. in diameter. This was slow to detach and was cut away on December 2. The wound was clean at the time of his death.

Beginning in December he developed edema of his feet and ankles which increased until the sacral area was involved. About the same time he developed a severe jaundice. This, however, seemed to respond favorably to 1000 cc of intravenous 5 per cent glucose daily.

The treatment was mainly supportive as would be given to any chronic illness.

He received in addition a complete course of *Brucella abortus* and *Melitensis* vaccine and Parke Davis & Co. arsphenamine to a total of 25 gm.

Because of his anemia which was progressively becoming worse and as a therapeutic attempt, a transfusion of 250 cc of whole blood was given to him on December 15 from a donor who had recovered from undulant fever in August. On December 22 he was given 200 cc of whole blood and 300 cc of citrated blood. He seemed to be slightly better symptomatically after the transfusions but he died suddenly in what appeared to be complete heart failure when an attempt was made to move him on December 27.

The autopsy findings were most interesting. On opening the abdomen about 20 liters of a thin, cloudy, serous fluid were found. A sample of this fluid was sent for an agglutination test for undulant fever. It was reported positive in a dilution of 1:15 but negative in 1:45. On stripping the abdominal wall away from the right chest there was found an abscess lying between the peritoneum, the skeletal musculature and the falciform

ing on after taking Epsom salts and preceded by a year and a half of slight constipation

'The patient had had a gunshot wound in the left flank during the World War' Whether that has any bearing we will consider later. It is a fact which may be of etiologic significance. He also had had an epidermoid carcinoma of the tongue. Thus in the past history we have two factors which may be of etiologic significance, one mechanical, the other malignant.

In the physical examination we have some evidence that confirms the impression of colonic obstruction. This roaring peristalsis would certainly be consistent with the story, but also we have some extraordinary new evidence which apparently had given rise to little or no symptomatology, namely, some chest signs. As I interpret these signs they are classical either of a fluid at the left base or possibly of a solid lesion of the left base, such as a new growth or some other kind of consolidation of the lung with a plug in the bronchus. I do not see how these signs can be interpreted on any other basis than that, or rather I do see how they could but I will come to that later.

It is of interest that he had no fever. His pulse was 90 and the respirations were 20. In other words, his chart was essentially negative. The urine was negative. He had no anemia. He had a slight leukocytosis, so that really the clinical pathology was essentially negative. I do not attach any great significance to 11,000 white cells with an abdominal situation of this kind.

Then the radiologist came along and did his bit. He made two examinations two days apart. A whole lot happened in the patient's chest between these. So far as I can make out there is nothing much to be seen in the first picture beyond a high left diaphragm with an air bubble below it. In the second picture there is what appears to be a left pleural effusion with displacement of the heart to the right. A fluid level, low in the left chest, appeared in the dull area. I should like very much to know whether it is above or below the diaphragm. Probably the radiologist will be able to tell us. If it is above the diaphragm, there must be either an abscess cavity or empyema communicating with a bronchus, unless perchance a hollow abdominal viscus has entered the chest through a hernia. The absence of productive cough in the history is against abscess or empyema communicating with a bronchus.

Before calling on the radiologist we may summarize what we have up to this point. There seems to be definite evidence of acute, rather low intestinal obstruction, evidence of rapidly developing pleural effusion and some suggestion of a hollow viscus in the thorax. Let us now ask for the radiologist's opinion.

DR RICHARD SCHATZKI. The examination of

the colon showed that the barium came to an abrupt stop at the splenic flexure, though spot films showed normal rugae in the region of the obstruction. The narrowing was therefore interpreted as due to pressure from outside. There was an air bubble above this region. In the anteroposterior view the air bubble lay below what appeared to be the left leaf of the diaphragm, but one must remember that the diaphragm has two leaves.

#### DIFFERENTIAL DIAGNOSIS

DR MEANS. Our problem is how to explain this rapidly developing pleural effusion and the fairly rapidly developing colonic obstruction. I suppose that either of these affairs could be due to malignancy, to infection or to some purely mechanical cause.

In regard to the hints in the history—there is a gunshot wound that he sustained in the war. One wonders whether his diaphragm could have been injured and whether he might have sustained a lesion there that either produced a diaphragmatic abscess which did not interfere with bowel function but made a weak place that later on gave way under some strain. One is impressed with the fact that all of these events came on after the taking of Epsom salts, and after rather violent bowel movements. It is conceivable that that trauma to his bowel did something to an existing diaphragmatic hernia which I think would pretty well account for the whole picture. Of course I have been very conscious of diaphragmatic hernia since I came to grief in Hartford on a case that Dr Stoll presented here later, a patient with a hydrothorax which turned out to be a stomach in the chest half full of water. However, in that case there was a good fluid level across the middle of the thorax. In this case there is a fluid level but it is underneath the effusion and we do not know where it is which makes it difficult. One can get a rapidly developing effusion into the chest on a purely irritative basis. I have seen it occasionally. There is possibly something going on beneath the diaphragm that has started up an irritant which has given rise to an effusion in the thorax.

We also have to think of the kinds of fluid that might be present in the chest. Could this be a hemothorax? I do not see how he could have filled his chest with blood without other manifestations of hemorrhage that they would tell us about. I cannot conceive of this filling up with pus so rapidly as that. I do not think it is only fluid in a hollow viscus because there is no fluid level. It is a good thing to realize that among the kinds of fluid that might be in the chest is stomach contents inside of the stomach. Let us leave the chest for the moment.

What causes might there be for an acute obstruction in the colon? There is this matter of



# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT, M D

TRACY B MALLORY, M D, *Editor*

CASE 22431

## PRESENTATION OF CASE

A 46 year old Italian tailor was admitted complaining of abdominal pain

The patient had been slightly costive for about a year and a half, and as a result took a laxative once a week. Two days before entry he took a dose of Epsom salts which resulted in six loose, rather violent bowel movements. This produced some weakness but he felt well otherwise until the following day when he became aware of the gradual onset of cramp-like colicky pains in his lower abdomen, more marked on the left side, and often sufficiently severe to cause him to double up. A physician was called who gave him a hypodermic injection which produced some relief. He vomited once at the onset but not thereafter. The vomitus consisted of thin watery fluid. There was no distention and no further bowel movements followed those noted above. There was no history of weight loss, tarry stools, or recent change in bowel habit.

The patient had had a gunshot wound in the left flank during the World War. An epidermoid carcinoma of the tongue was treated by radium implantation a year and a half before entry.

Physical examination showed a well-developed and nourished man in no acute discomfort. He coughed occasionally during the examination. There was slight scarring of the left border of the tongue. One small hard gland was palpated in the submaxillary region. At the left lung base there was dullness to percussion and absent tactile fremitus. Breath sounds were also absent. The dullness extended upward anteriorly to the sixth rib and posteriorly to the seventh. The abdomen was slightly distended. Intermittent, roaring peristalsis was audible, often without the stethoscope.

The temperature was 98°, the pulse 90. The respirations were 20.

Examination of the urine was negative. The blood showed a red cell count of 5,050,000, with a hemoglobin of 80 per cent. The white cell count was 11,650, 86 per cent polymorphonuclears.

A barium enema passed to the splenic flexure where it met a complete obstruction. The bowel proximal to this point was filled with gas and fecal material. Detail examination showed a smooth narrowing of the bowel extending into the pathologic region and the converging mucosal folds appeared to be normal. The diaphragm on the left side was high and limited in excursion. The costophrenic angle was obliterated by what appeared to be a thickening of the pleura or a very small amount of fluid. An x-ray examination of the chest two days later showed dullness obliterating the lower half of the left chest with a hazy curved upper border. The mediastinum was shifted slightly to the right and the left diaphragm was still said to be high.

He developed hiccough but otherwise his condition remained unchanged. On the fourth hospital day a laparotomy was performed.

## NOTES ON THE HISTORY

DR J H MEANS. It says in the last line of the record "there was no history of recent change of bowel habit", but the first line would seem to contradict that because it says that he had been slightly costive for a year and a half and he had had extraordinary changes in bowel habit during the last few days. I do not know whether that slight costiveness over a year and a half is significant, but I do think it is wise in the practice of medicine to look upon any change in bowel habit in a middle-aged person as requiring investigation. Two days before entry we note that having taken a mild laxative he decided to do better than that and took a dose of Epsom salts that produced these violent movements. Whether that is of any etiological significance is not clear at the moment. It may be. We will note it as an interesting event at any rate.

Next apparently he developed rather gradual cramp-like colicky pains in the abdomen, more on the left side. That is a very impressive symptom, it seems to me, and when we are told it caused him to double up and the physician gave him a hypodermic we are justified in thinking he had very severe abdominal pain. It is significant that he vomited thin watery fluid only once. Following this he had absolute obstipation until the time the history was taken.

The history is very suggestive of an acute obstruction in the alimentary canal, one would say in the colon, because of the lack of any statement about toxic manifestations which one would expect in a higher obstruction, and also because of the fact that there was vomiting on only one occasion. The cramp-like colicky pains combined with obstipation certainly would be consistent with an obstruction in the colon, so that on the history we can say that this man has an acute colonic obstruction apparently complete.



reached by the examining finger. Further rectal examinations, however, during the succeeding years were repeatedly negative. Proctoscopy likewise failed to demonstrate the mass and films of barium enemas showed only a large redundant colon although on one occasion an examination suggested a small polyp of the colon. This was never demonstrated in later films. Subsequently the patient continued to have attacks about four or five times a year but for the year and a half preceding entry he was free from symptoms and his bowel movements were unusually regular. Four days before admission the patient had constant and slowly increasing abdominal distention and visible peristalsis. Defecation ceased but there was passage of a large amount of clear watery material. There was slight rectal bleeding on the day before coming to the hospital and the patient had marked anorexia. There was, however, no nausea or vomiting and no note of pain.

About a month before this entry the patient entered the hospital because of hematuria and pain in the right costovertebral region. An intravenous pyelogram at that time showed delay in the appearance of the dye in the right kidney. The right pelvis was at no time well filled and the dye showed irregular distribution. The calices were dilated, blunted, and possessed irregular outlines. The left kidney and bladder were negative. Later films showed what presumably was a stone in the right ureter but attempted cystoscopic removal was unsuccessful. He remained in the hospital for a week and had no further urinary dysfunction.

Physical examination showed a thin, frail, elderly man. The skin and mucous membrane were pallid and the eyes exhibited a pronounced anisocoria. The heart was normal and the lungs clear. The blood pressure was 118/75. The abdomen was distended and generally tympanitic. Peristalsis was both audible and visible but there were no palpable masses or tenderness. Rectal examination showed again the presence of a mass similar to that originally palpated but somewhat larger. It was said to be the size of two thumbs.

The temperature was 98°, the pulse 100. The respirations were 20.

Examination of the urine was negative. The blood showed a red cell count of 4,200,000 with a hemoglobin of 75 per cent. The white cell count was 8,000, 72 per cent polymorphonuclears.

A plain x-ray film of the abdomen showed a moderate quantity of gas in the colon and stomach. There was no definite evidence of intestinal obstruction.

Shortly after entry a laparotomy was performed.

## DIFFERENTIAL DIAGNOSIS

DR EDWARD L. YOUNG JR. There are several things that come into our minds promptly on reading this history. First, the possibility, with indigestion over a long period of time, of whether there is biliary tract disease. Then the attack starting six years before entry suggests intermittent intestinal obstruction as a possibility, and at once you try to hitch up that possibility with a previous biliary tract disease, as could be done by assuming that a gallstone had ulcerated through into the small bowel and caused what gallstone ileus always does cause, intermittent attacks generally for a considerable period of time before the final complete obstruction.

The interesting thing about the recent attacks is the evacuation of clear colorless fluid. That is not of course characteristic of gallstone ileus and we tuck that away until we read the rectal examination which revealed what was thought to be a soft polypoid mass. An adenomatous polyp is a fairly common condition in the large bowel and it is perfectly possible for that to exist in the sigmoid and under certain conditions to prolapse so that, as here, it would be felt by one person who happened to examine the patient when he was on his feet and peristalsis had pushed it down, and then not to be felt again. That would fill the bill here, a prolapsing polyp with partial intussusception of a loose segment into itself with an excessive secretion of mucus below.

It is true of course that acute renal upsets can initiate a reflex of abdominal disturbances sufficiently severe to simulate an acute abdominal emergency. We have seen them not infrequently. They may simulate either an intra-abdominal inflammatory condition or an acute intestinal obstruction. However, this episode was a month before entry and there is no further note of trouble referable to the right kidney, so that I think we can throw it out of the picture.

The fact that the x-ray did not show this lesion does not mean it is not there. It takes very accurate technique with the enema and with the contrasting film with air after emptying to give any chance of showing small polyps and even then they may be missed. So that I think a positive digital examination here is what makes a diagnosis.

The patient had for three days the same clear fluid and then it became bloody. This is due to increasing intussusception and interference with the blood supply. Or it may suggest that this polyp has done what all large bowel polyps do eventually—changed from a simple adenoma to a malignancy.

The temperature, pulse and respiration would seem to me to rule out any intussusception of

carcinoma of the tongue I know very little about carcinoma of the tongue so I looked it up in Ewing's and it says, "metastases from tongue cancers in the esophagus are rare but have been observed in the liver, heart, adenal and mesentery" Extension to the lungs and pleura are even rarer Altogether it seems to me very unlikely on the doctrine of chances that this carcinoma had anything to do with the present situation However, he might have a new cancer We know that a person with one cancer may have another The patient is a person who has had a previous carcinoma and may have a new one, but I doubt if his present lesion is metastatic from the tongue

As to malignant disease, we might have a cancer of the colon itself There was no evidence in the x-ray to suggest that such a lesion was present We might have a malignant process outside of the bowel making pressure upon it at that point It might involve the diaphragm and in that way be responsible for this irritative pleural effusion I am not very pleased with such an interpretation, however, as it seems to me rather strange, but it is a possibility

I cannot see any reason to suppose he has a subdiaphragmatic abscess that could give rise to an irritative effusion in the thorax because there is no evidence of infection, no fever and almost negligible leukocytosis, and no history of symptoms suggesting infection in any way

I cannot make a diagnosis beyond colonic obstruction and pleural effusion I believe that they are due to one cause What that could be I do not know but I rather think that diaphragmatic hernia with something going on in the herniated viscus is the most plausible interpretation I would put some form of malignancy either in the bowel or more likely outside of the bowel, making pressure upon it, as a second choice

#### PREOPERATIVE DIAGNOSIS

Splenic flexure obstruction, carcinomatous

#### DR J. H. MEANS'S DIAGNOSES

Acute colonic obstruction  
Pleural effusion  
Diaphragmatic hernia?  
Malignancy involving the colon?

#### PATHOLOGIC DIAGNOSIS

Diaphragmatic hernia

#### PATHOLOGIC DISCUSSION

DR TRACY B. MALLORY One of the most successful plays in badminton, which is a game I play a great deal, is to put the bird twice to exactly the same spot and try to catch the man as he is pulling away from the area I thought I might catch Dr. Means by that method on

this case The man did have a diaphragmatic hernia and Dr. Miller will tell us about it

DR RICHARD MILLER I want to congratulate Dr. Means on an extraordinarily keen diagnosis We did not think of diaphragmatic hernia We thought it was some type of malignancy On opening the abdomen it was obvious that there was some sort of mass adherent to the undersurface of the diaphragm on the left, and it became apparent that the colon, at the splenic flexure, and the omentum, which was thick, were adherent there There was an opening in the diaphragm, elliptical in shape, and just about large enough to take two fingers It was impossible to pull the abdominal viscera down, so we enlarged the opening to two inches long and pulled down a handful of purplish colored great omentum and a small loop of colon near the flexure The omentum was probably viable but we were not sure, so we removed the involved portion The colon was viable Once these were pulled out one could see the collapsed left lower lobe of the lung It was very easy to close the opening in the diaphragm, which was then done The patient made an uneventful recovery and has gone home

DR MEANS What about the fluid in the chest? I meant to comment on the fact that they did not tap this chest fluid They might have been prompted to be curious enough to tap prior to operation

DR MALLORY As I recall he was tapped and they obtained a little fluid slightly tinged with blood

DR MEANS Did you find any great amount of free fluid at the time of operation

DR MILLER Only a few cubic centimeters

DR MEANS The other question I would like to ask is about the gunshot wound Do you think it was responsible?

DR MALLORY I do not know, but I am inclined to think so

#### CASE 22432

#### PRESENTATION OF CASE

A 75 year old American businessman was admitted complaining of abdominal distention

For about thirty years the patient had been troubled frequently by indigestion, gaseous eructation, and constipation Six years before admission he began to have attacks of distention, abdominal pain, and frequent small evacuations of clear colorless fluid within which there was no fecal material The attacks would persist for several days and were usually relieved by colonic irrigation Peristaltic waves were always visible but because of his thin abdominal wall this was considered to be of little significance Five years before entry a rectal examination revealed the presence of what was thought to be a soft polypoid mass just barely

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## UNDULANT FEVER

In a recent article by Hardy, Jordan and Borts the increase during the past ten years in the recognized cases of undulant fever throughout the United States is brought out and certain interesting and important epidemiologic aspects of the disease are clearly demonstrated.

Undulant fever may be caused by three different species of brucellae—*Brucella melitensis* the caprine strain *Brucella abortus*, the bovine strain and *Brucella suis*, the porcine strain. The first the etiologic factor in Malta fever, is rarely isolated from cases of undulant fever in this country and, when found, is almost invariably from imported cases or laboratory infections. The etiologic importance of the other two strains is dependent on geographic location. Thus, in New York approximately 93 per cent of the classified strains are bovine, whereas in Iowa about 70 per cent of the strains are porcine. The hazard of exposure to porcine strains is far greater than that to bovine and the clinical reports of cases due to the former show that the

disease is almost always more protracted and severe.

From 24 cases reported from five states in 1925, the number increased to 1,897 from forty-five states in 1935. In the latter year, 187 and 234 cases were reported from Iowa and New York, respectively. The average of the morbidity rates in Iowa, Missouri and Kansas is much higher than that in other parts of the country and is probably due to the high incidence of infection in the large number of hogs in this particular area. Statistics compiled by the U. S. Department of Agriculture indicate that the percentage of heads of cattle that are infected is remarkably constant throughout the United States and the low morbidity rates in certain states are undoubtedly the result of less accurate recognition and reporting of the cases.

The importance of the risks of occupation is clearly shown by a listing by occupation of the cases in Iowa. The morbidity rate for packing house employees is excessively high and that for men on the farm comparatively so. Nearly two-thirds of the cases are accounted for in men or women whose occupation is such as to bring them in contact with cattle, hogs or their products. The seasonal variation suggests that heavier exposures during and following calving and farrowing are, at least in part, responsible factors.

Undulant fever is not a common disease in Massachusetts, but a total of 42 cases was reported in 1935, giving a morbidity rate of 10 per 100,000 population. The morbidity rate for Vermont, as given by Hardy, Jordan and Borts was 5.5, second only to Iowa, and those for Connecticut and Maine were 3.0 and 2.3, respectively. The relatively low incidence in Massachusetts is, of course, partly explained by the relatively high percentage of urban population, but the effect of fairly widespread pasteurization of milk cannot be disregarded.

## REFERENCE

Hardy, A. V., Jordan, C. F. and Borts, I. H. Undulant fever.  
Further epidemiologic and clinical observations in Iowa.  
J. A. M. A. 107:509 (Aug. 22) 1936.

## THE EXTENSION OF THE NEW YORK HOSPITAL PLAN

The success of the three-cents-a-day plan for the utilization of hospitals by the people of New York City and vicinity has been so pronounced that an extension of the service has been announced by the Associated Hospital Service.

Under the original plan more than a hundred thousand individuals have subscribed for the service rendered by nearly two hundred hospitals. The new plan provides for the care of a husband, wife, and unmarried children under nineteen years of age on a seven cents a day

importance, where the blood supply has been seriously interfered with, and that the blood is presumably coming from damaged tumor. I was interested in asking one of the younger men what he thought of the value of preoperative x-ray in this condition. He had seen a great many of the cases here in the last few years and he said, "I do not believe the x-ray gives us any help in these cases." The idea that a distended loop of small bowel is pathognomonic of intestinal obstruction did not seem significant to him. Here, it does not seem to be so. The clinical evidence is of acute intestinal obstruction. The fact that the patient did not vomit means two things, first that the blood supply has not been seriously interfered with, because this starts reflex vomiting, and secondly that it is low down, because we know that with purely mechanical obstruction low in the large bowel vomiting does not necessarily come on for several days after the obstruction has been complete. I should assume that the story here was that the prolapse of this polyp acted as an obturator presumably with intussusception of the bowel but without interference with the blood supply. The early suggestions of biliary tract disease can be eliminated, I believe from consideration in view of the final story.

#### PREOPERATIVE DIAGNOSES

Polyp of the descending colon, ? carcinoma  
Intussusception

#### DR EDWARD L. YOUNG'S DIAGNOSES

Acute intestinal obstruction from intussusception of the sigmoid into itself due to a polyp of the sigmoid.  
? of malignancy

#### PATHOLOGIC DIAGNOSIS

Papillary colloid adenocarcinoma of the colon with metastasis to one regional lymph node

#### PATHOLOGIC DISCUSSION

DR TRACY B. MALLORY: This man was a patient of Dr. John Homans. I am sorry he is not here to tell us about the case himself. He made the first rectal examination and was perfectly certain at the time that he felt a polyp. He told the patient that it was potentially dangerous and should be operated upon without delay but the patient refused. At no succeeding examination for several years was he able to find it again, either with the finger or by proctoscopy and the x-ray report was somewhat equivocal. Then the final episode occurred and once again the tumor was obviously present low in the rectum. At this time the patient consented to operation and on exploration Dr. Homans found, as he confidently expected, an intussusception, evidently caused by the presence of this polypoid tumor. The tumor had in all probability been benign six years ago and in the interval had become definitely malignant. Microscopically it was a frank carcinoma and one of the half dozen lymph nodes sectioned showed metastasis.

A PHYSICIAN: How high up was it?

DR MALLORY: It was well up toward the upper end of the sigmoid and the intussusception was a relatively long one but readily reducible. Dr. Homans reduced it before resecting it.

DR YOUNG: In other words there was no damage to the blood supply. I think the white count is important in that respect.

DR MALLORY: The bleeding was from ulceration of the malignant mass itself.

When Associated with Spinal Cord Injuries" Page 766 Address 818 Harrison Avenue, Boston, Mass

MARKS, JOSEPH H B A, M A, M D Harvard University Medical School 1929 Roentgenologist, Truesdale Hospital, Fall River His subject is "Roentgen Ray Findings in Diaphragmatic Hernia" Page 777 Address 151 Rock Street, Fall River, Mass

GOTTLEB, JACQUES S B S, M D Harvard University Medical School 1933 Formerly, Member of Staff, Worcester State Hospital, Worcester, Mass, Assistant Resident in Neurology, Montefiore Hospital, New York City, and Intern, Hahnemann Hospital, Worcester Now Resident and Instructor in Psychiatry, Psychopathic Hospital, University of Iowa Medical School, Iowa City, Iowa His subject is "Undulant Fever An Unusual Case with Necropsy" Page 781 Address Psychopathic Hospital, Iowa City, Iowa

## The Massachusetts Medical Society

### FOURTH ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The Massachusetts Medical Society Committee on Postgraduate Instruction submits the following programs of extension courses which include all of the districts that were not published in *The New England Journal of Medicine* issue of September 24 1936

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#### BRISTOL SOUTH DISTRICT (Fall River Section)

Postgraduate Extension Curriculum

November 9

Heart Disease (Two Sessions)

Session 1 Treatment of Cardiovascular Emergencies Instructor—R E. Glendy

November 16

Session 2 The Prognosis of Heart Disease Instructor—Ashton Graybiel

November 23

Psychiatry (One Session)

(a) Psychobiology in General Medicine  
(b) The Common Neuroses

Instructor—K. J. Tillotson

November 30

Diabetes (One Session)

Complications of Diabetes and Their Treatment. Coma Insulin Reactions Surgery (Gangrene Carbuncle Etc.) Marriage and Pregnancy Tuberculosis and Heart Disease Instructor—Alexander Marble

December 7

Lung Disease (Two Sessions)

Session 1 Pneumonia and Its Complications Diagnosis and Treatment Instructor—Roderrick Hefron

December 14

Session 2 Suppurative Lung Disease Lung Abscess and Bronchiectasis Instructor—F T Lord

The course will be given at the Stevens Clinic of the Union Hospital Fall River, on Mondays at 4 p m

HOWARD P SAWYER, M.D.,  
District Co-Chairman Postgraduate Instruction

#### BRISTOL SOUTH DISTRICT (New Bedford Section)

Postgraduate Extension Curriculum

November 13

Heart Disease (Two Sessions)

Session 1 Treatment of Cardiovascular Emergencies Instructor—Sylvester McGinn

November 20

Session 2 The Prognosis of Heart Disease Instructor—C L Derick

November 27

Diabetes (Two Sessions)

Session 1 General Plan of Treatment in Uncomplicated Cases Diet Insulin (Regular and Protamine) Exercise Instructor—H F Root

December 4

Session 2 Complications of Diabetes and Their Treatment Coma Insulin Reactions Surgery (Gangrene, Carbuncle Etc.) Marriage and Pregnancy, Tuberculosis and Heart Disease. Instructor—H F Root

December 11

Acute Abdominal Emergencies. (One Session) Instructor—H M Clute

December 18

Anesthesia. (One Session)

(a) Drugs in Anesthesia.  
(b) General Care of Patient in Anesthesia Instructor—S C Wiggin

The course will be given at St Luke's Hospital, New Bedford, on Fridays at 4 p m

ROBERT H GOODWIN M.D.  
District Co-Chairman Postgraduate Instruction

basis Where the family consists of only husband and wife, the rate is five cents a day

These two new plans are available only on the payroll reduction basis That is, the fee is paid from the payroll of the participating prospective patient The average period of illness is estimated to be twenty-one days

Further explanation of the plan will be found on page 794

### ETHER DAY

THE celebration of Ether Day at the Massachusetts General Hospital this year was even more significant than usual for it marked the ninetieth anniversary of the first public demonstration of surgery made painless through the administration of an anesthetic As is well known to the majority of New England physicians, it was on October 16, 1846, that Dr John C Warren performed an operation in the surgical amphitheater of the Massachusetts General Hospital on a young printer by the name of Gilbert Abbott, who had been rendered unconscious through the inhalation of ether, administered by Dr W T G Morton

In a statement released by Dr C W Munger, president of the American Hospital Association and signed by several hundred prominent individuals, this anniversary has been used to illustrate the contributions made to medical science by the voluntary or philanthropic hospitals throughout the United States The statement urges the support of such institutions by the public and states, in part, "This anniversary is a symbol of the scientific progress made with the cooperation of voluntary hospitals There is good reason to hope that similar progress can be made in the future provided adequate support is forthcoming

"The contribution of the hospitals to the improvement of America's health is not to be measured merely in terms of humane care of the sick, but in lives saved, in pain eased in doctors, nurses and other professional workers trained, in charitable ministrations to the sick, in scientifically aiding the advancement of medicine through provision of workshops for the medical profession, in the prevention and the conquest of disease, and in the stimulation of governmental institutions to higher levels

"We believe it absolutely essential that Americans realize that adequate support for their community hospitals is not a question of helping some one else, but is vital self-protection"

### MATERNAL MORTALITY IN BOSTON

THE combined meeting on next Wednesday evening, October 28, at 8 15, at the Boston Medical Library, of the Suffolk District Medical Society with the Obstetrical Society of Boston

to hear the report on Maternal Mortality in Boston for 1933-1935 should be well attended by all of those physicians interested in the welfare of Boston The committee has analyzed carefully the causes of the maternal mortality for these three years, and the meeting should prove a very valuable one

The discussion will be opened by Dr Charles Wilinsky of the Boston Department of Health, with whose cooperation the study was undertaken Dr John T Williams, president of the Obstetrical Society, will continue the discussion The report will then be open for general discussion from the floor, and it is hoped that a free and frank expression of opinion will follow

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

BROWNE, WILLIAM E M D Tufts College Medical School 1913 F A C S Surgeon in Chief, Second Surgical Service, Carney Hospital Clinical Professor of Surgery, Tufts College Medical School His subject is "The Necessity for Use of Splints at Certain Stages in the Treatment of Infections of the Hand, with a Demonstration of Some of the Newer Types." Page 743 Address 587 Beacon Street, Boston, Mass

HATT, R NELSON M D Tufts College Medical School 1918 F A C S Chief Surgeon, Shriners' Hospital for Crippled Children Orthopedic Surgeon, Wesson Memorial Hospital Consulting Orthopedic Surgeon, Springfield Hospital, Springfield, Noble Hospital, Westfield, and Harrington Memorial Hospital, Southbridge His subject is "Diseases and Injuries of the Hip Joint" Page 749 Address 146 Chestnut Street, Springfield, Mass

REID, MONT R A B, M D Johns Hopkins University School of Medicine 1912 Professor of Surgery, University of Cincinnati College of Medicine Director of the Surgical Services at the Cincinnati General Hospital and the Children's Hospital His subject is "Some Considerations of the Problems of Wound Healing" Page 753 Address Cincinnati General Hospital, Department of Surgery, Cincinnati, Ohio

MUNRO, DONALD A B, M D Harvard University Medical School 1916 F A C S Visiting Surgeon in charge of Neurological Surgery, Boston City Hospital Assistant Professor of Neurological Surgery, Harvard University Medical School Consultant in Neurological Surgery, Massachusetts Memorial Hospitals and Waltham Hospital Associate Professor of Neurological Surgery, Boston University School of Medicine His subject is "The Cord Bladder Its Definition, Treatment and Prognosis

- (a) Psychobiology in General Medicine
- (b) The Common Neuroses

Instructor—H C Solomon

November 20

Blood Diseases (Two Sessions)

Session 1 The Hemoglobin and Red Blood Cells in Relation to Disease Instructor—C W Heath

November 27

Session 2 Diseases Affecting the White Blood Cells Leukemias Agranulocytosis Mononucleosis Instructor—W B Castle

December 4

Diabetes (Two Sessions)

Session 1 General Plan of Treatment in Uncomplicated Cases Diet Insulin (Regular and Protamine) Exercise Instructor—E P Joslin

December 11

Session 2 Complications of Diabetes and Their Treatment Coma Insulin Reactions Surgery (Gangrene Carbuncle Etc) Marriage and Pregnancy Tuberculosis and Heart Disease Instructor—E P Joslin

December 18

Acute Abdominal Emergencies (One Session)  
Instructor—H. M. Clute

The course will be given at the Burbank Hospital Fitchburg on Fridays at 4 30 p m

EDWARD A. ADAMS M.D.  
District Chairman Postgraduate Instruction

# SCHEDULE FOR WEEK BEGINNING OCTOBER 26

## Barnstable

Sunday November 1 at 4 00 p m at the Cape Cod Hospital Hyannis Subject Diseases Affecting the White Blood Cells Leukemias Agranulocytosis Mononucleosis Instructor C S Keefer John I B Vail Chairman

## Berkshire

Thursday October 29 at 4 30 p m at the House of Mercy Hospital Pittsfield Subject Stomach and Duodenal Ulcer Diagnosis and Treatment. Instructor T V Urmv Melvin H Walker, Jr Chairman

## Essex South

Tuesday October 27 at 4 00 p m at the Salem Hospital Salem Subject Complications of Diabetes and Their Treatment. Coma Insulin Reactions Surgery (Gangrene Carbuncle Etc) Marriage and Pregnancy Tuberculosis and Heart Disease Instructor

Reginald Fitz Walter G Phippen Chairman

## Franklin

Wednesday October 28 at 8 00 p m at the Franklin County Public Hospital Greenfield Subject Diseases Affecting the White Blood Cells Leukemias, Agranulocytosis Mononucleosis Instructor C W Heath Halbert G Stetson, Chairman

## Hampden

Thursday October 29 at 4 00 p m at the Academy of Medicine Professional Building 20 Maple Street, Springfield and at 8 30 p m., in the Outpatient Department of the Skinner Clinic Holyoke Hospital Holyoke Subject Neurological Surgery The Signs and Symptoms of the Common Brain Lesions—Organic and Traumatic Instructor Donald Munro George L Schadt and George D Henderson Chairmen

## Hampshire

Wednesday October 28 at 4 15 p m in the Nurses Home of the Cooley Dickinson Hospital Northampton Subject Stomach and Duodenal Ulcer Diagnosis and Treatment Instructor E. S. Emery Jr Robert B Brigham Chairman

## Middlesex East

Tuesday October 27 at 4 00 p m at the Melrose Hospital Melrose Subject Anesthesia (a) Drugs in Anesthesia (b) General Care of Patient in Anesthesia Instructor P D Woodbridge Joseph H Fav Chairman

## Middlesex South

Tuesday October 27 at 4 00 p m at the Cambridge Municipal Hospital Cambridge Subject Dermatology and Syphilis (a) Common Skin Diseases (b) Diagnosis and Treatment of Early Syphilis Instructor E. L. Oliver Edmund H Robbins Chairman

## Norfolk

Friday October 30 at 8 30 p m at the Norwood Hospital Norwood Subject Diabetes General Plan of Treatment in Uncomplicated Cases Diet Insulin (Regular and Protamine) Exercise Instructor Alexander Marble Hugo B C Riemer Chairman

## Worcester (Milford Section)

Thursday October 29 at 8 30 p m. in the Nurses Home of the Milford Hospital Milford Subject Heart Disease Treatment of Cardiovascular Emergencies Instructor J M Faulkner Joseph Ashkins Sub-Chairman

## MIDDLESEX NORTH DISTRICT

## Postgraduate Extension Curriculum

November 6

Acute Abdominal Emergencies (One Session)

Instructor—A W Allen

November 13

Heart Disease (Two Sessions)

Session 1 Treatment of Cardiovascular Emergencies Instructor—S A Levine

November 20

Session 2 The Prognosis of Heart Disease Instructor—B E Hamilton

November 27

Stomach and Duodenal Ulcer (One Session)

Diagnosis and Treatment Instructor—E S Emery, Jr

December 4

Blood Diseases (Two Sessions)

Session 1 The Hemoglobin and Red Blood Cells in Relation to Disease Instructor—W P Murphy

December 11

Session 2 Diseases Affecting the White Blood Cells Leukemias Agranulocytosis, Mononucleosis Instructor—W B Castle

The course will be given at St Joseph's Hospital, Merrimack Street, Lowell, on Fridays at 7 p m

SAMUEL A DIBBINS, M D,

District Chairman, Postgraduate Instruction

## NORFOLK SOUTH DISTRICT

## Postgraduate Extension Curriculum

November 9

Arthritis (One Session)

Diagnosis and Treatment Instructor—H A Nissen

November 16

Diabetes (Two Sessions)

Session 1 General Plan of Treatment in Uncomplicated Cases Diet Insulin (Regular and Protamine) Exercise Instructor—Priscilla White

November 23

Session 2 Complications of Diabetes and Their Treatment Coma, Insulin Reactions Surgery (Gangrene Carbuncle Etc) Marriage and Pregnancy Tuberculosis and Heart Disease Instructor—Priscilla White

November 30

Psychiatry (One Session)

(a) Psychobiology in General Medicine

(b) The Common Neuroses

Instructor—H C Solomon

December 7

Blood Diseases (Two Sessions)

Session 1 Diseases Affecting the White Blood Cells Leukemias, Agranulocytosis Mononucleosis Instructor—M B Strauss

December 14

Session 2 The Hemoglobin and Red Blood Cells in Relation to Disease Instructor—G R Minot

The course will be given at the Quincy City Hospital Quincy on Mondays at 8 30 p m

DAVID L BELDING MD

District Chairman, Postgraduate Instruction

## PLYMOUTH DISTRICT

## Postgraduate Extension Curriculum

November 10

Lung Disease (One Session)

Pneumonia and Its Complications Diagnosis and Treatment Instructor—Roderick Helfron

November 17

Acute Abdominal Emergencies (One Session)

Instructor—S J G Nowak

November 24

The Physical Examination (One Session)

Its Scientific Clinical and Economic Implications Instructor—L E Parkins

December 1

Blood Diseases (One Session)

The Hemoglobin and Red Blood Cells in Relation to Disease Instructor—C W Heath

December 8

Stomach and Duodenal Ulcer (One Session)

Diagnosis and Treatment Instructor—T V Army

December 15

Diabetes (One Session)

General Plan of Treatment in Uncomplicated Cases Diet Insulin (Regular and Protamine) Exercise Instructor—Reginald Fitz

The course will be given at the Brockton Hospital, Brockton on Tuesdays at 4 p m

WALTER H PULSIFER MD

District Chairman Postgraduate Instruction

## WORCESTER NORTH DISTRICT

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WALTER H PULSIFER M D

*District Chairman Postgraduate Instruction*

## WORCESTER NORTH DISTRICT

## Postgraduate Extension Curriculum

November 13

Psychiatry (One Session)

## GROUP ENROLLMENT

- (A) For employed persons in organizations where there are more than 25 employees or members
- 1 Such persons may enroll only by submitting their applications with a group formed among their fellow employees or members
  - 2 Only under the following conditions are no specified number of applications required, except for the minimum of 10 applications from employed persons  
When the employer or directing head of any organization extends cooperation whereby the plan is fully presented to all or nearly all employed members in a manner mutually agreed upon
  - 3 Once an organized group of employed subscribers has been formed and submitted, no additions may be made to such group except under special arrangements
  - 4 Employed persons who subscribe as members of such a group may enroll the members of their household such as wives, children, and so forth regardless of number, either as individuals or as members of a family group
- (B) For employed persons in organizations where there are less than 25 employees, and persons self-employed or self-supporting but not employed
- 5 Such employed persons may form a group of subscribers who likewise are employed in organizations having less than 25 employees
  - 6 Such an independently formed group must include at least 10 applications from employed persons. Such subscribers may enroll the members of their household, such as wives, children and so forth, regardless of number, but for the present will not be entitled to enroll as a family group as described in the folder
  - 7 After such a group of applications has been submitted *no additions will be accepted*. Members of the subscriber's household not included in the original group may enroll only in a new group in accordance with these regulations

## REQUIREMENTS FOR APPROVAL OF COLLEGES, UNIVERSITIES AND MEDICAL SCHOOLS

The following qualifications will be required by the Approving Authority of the Commonwealth of Massachusetts for approval of a college or university giving two years of premedical collegiate work and for approval of a medical school

STEPHEN RUSHMORE, M.D. *Chairman*  
Approving Authority

October 16 1936

## QUALIFICATIONS REQUIRED FOR APPROVAL OF A COLLEGE OR UNIVERSITY AS GIVING TWO YEARS OF PREMEDICAL COLLEGIATE WORK INCLUDING PHYSICS CHEMISTRY AND BIOLOGY

(a) The institution will be approved if it has already been approved by the Association of Amer-

ican Universities or the Regional Association of Colleges and Secondary Schools in the territory in which the institution is located

(b) Since approval by the above noted organizations may be lacking because it has not been sought or has been refused, and since an educational institution should be judged by its objectives and its adequacy in attaining these objectives, specific requirements may present considerable variation. The following general requirements have, however, been established

(1) The curriculum should presuppose educational qualifications required for graduation from a public high school as a condition for entrance to the institution.

(2) The instruction should be at the collegiate level generally required of institutions giving similar curricula in the regional group

(3) Since the teacher is the heart of an educational institution, the competence of the faculty, the organization of the faculty, the working conditions for the faculty and the quality of the instruction will receive special attention

(4) The physical facilities, including library, must be adequate for the objective of the institution

(5) The administrative organization and personnel should be adequate for accomplishing the objectives of the institution

(6) The institution should provide evidence of the financial resources adequate for and effectively applied to the support of its educational program

## QUALIFICATIONS REQUIRED FOR APPROVAL OF A MEDICAL SCHOOL

The minimum requirements for an approved medical school as set by the statute and by ruling of the Approving Authority under the statute are as follows

(1) The school must be legally chartered

(2) If the school confers degrees in medicine the school must be legally empowered to confer degrees in medicine

(3) If the school confers degrees in medicine the school must see to it that the statutory conditions are fulfilled namely that the candidate shall have taken a course of at least four years of not less than thirty-two weeks in each year before the degree is conferred

(4) If the power of the school to confer degrees is restricted under the charter the degrees conferred must be under the restriction of the charter

(5) The school must restrict admission of candidates to those who have had at least two years of premedical work in an approved college including courses in physics chemistry and biology

(6) A candidate seeking admission to an approved school after attendance in a nonapproved school, must receive specific approval from the

## ESSEX SOUTH DISTRICT MEDICAL SOCIETY

## APPLICANTS FOR EXAMINATION BY CENSORS

Dr Walter Louis Piotrowski, of Peabody, a graduate of Middlesex College School of Medicine, is a candidate for the Massachusetts Medical Society Recommended by Dr J W P Murphy, Dr S Chase Tucker, Dr John F Jordan, Dr Ralph E Foss, Dr P J Finnegan

R E STONE, M D, *Secretary*

## MISCELLANY

THE ASSOCIATED HOSPITAL SERVICE  
OF NEW YORK

Under a recent announcement family membership has been added to the three-cents-a day plan for hospital care

The amount and manner of payment of annual subscription charges are as follows

	An nu ally	Semi- Annu ally	Quar ter ly	Month- ly
1 Individual subscription	\$10 00	\$5 10	\$2 60	\$90
2 Husband and wife	18 00	9 00	4 50	1 50
3 Husband, wife and all unmarried children under 19 years of age	24 00	12 00	6 00	2 00

Monthly payments are accepted only by means of payroll deduction. Payments by subscribers as individuals may be made direct by each subscriber to the Associated Hospital Service upon written notice. An initial payment must accompany each application except when the payroll deduction method is used as in the case of family groups.

## WHO MAY JOIN

Since there are no occupational restrictions salary limitations or physical examinations only persons in good health and not more than 65 years of age who reside in the area served by member hospitals may become subscribers.

Eligible persons may now enroll as members of a family group as well as individuals in accordance with the enrollment regulations described in the folder. A family group will include

- 1 Husband and wife
- 2 Husband or wife and all their unmarried children under 19 years of age

Either the husband or wife who is employed may act as the family representative of such a family group. Such members of families however may enroll as a family group only when the family representative makes payment of subscription charges by means of payroll deduction through the cooperation of the employer.

Other members of a family or household may enroll provided their applications are submitted by another member of the family or household who is an employed subscriber. Once a person's application is accepted at the age of 65 or less, he may continue as a subscriber indefinitely.

## WHAT THIS PLAN OFFERS YOU

Every subscriber, including family members accepted by the plan, is entitled to any or all of these services which his own doctor says he needs

Hospital care for 21 days in one or more admissions

Semi private accommodations (2 to 4 beds in a room, not a ward)

Use of the operating room.

Use of the maternity delivery room (after you have been a subscriber for one year)

Necessary x ray and laboratory examinations for bed patients requiring hospital care

Anesthesia is included only when administered by a salaried employee of the hospital.

General nursing care

Routine medications and dressings

Private room upon the payment of the difference between \$4.50 and the daily rate of the room selected. Subscribers selecting a private room also are entitled to all the other services listed above.

Discount of 25 per cent off semi private hospital charges after first 21 days

These services will be rendered for any illness or injury except pulmonary tuberculosis venereal diseases those provided for under the Workmen's Compensation Law of any state quarantinable diseases or mental disorders. Maternity service will include the nursery care of the mother and the newborn child, provided the mother has been a subscriber for one year or longer.

## SERVICES NOT INCLUDED

The service rendered to you by a physician or surgeon and special private nurses are not included. X ray and laboratory examinations when the subscriber is admitted to a member hospital solely for diagnostic purposes also are not included under the plan, nor does the plan include services for conditions resulting from pregnancy during the first year of enrollment.

## WHEN SUBSCRIBER GETS SERVICE

Accident or Emergency Illness immediately after subscriber's application has been accepted

Other Illness or Injury any time after you have been a member for 10 days

Hospital Maternity Care any time after you have been a member for one year

Your doctor's decision that you need hospital treatment is all that is necessary to receive service

Hospital service will not include the treatment of conditions known to the subscriber to exist and to require hospital care at the date of application

GROUP ENROLLMENT

- (A) For employed persons in organizations where there are more than 25 employees or members
- 1 Such persons may enroll only by submitting their applications with a group formed among their fellow employees or members
  - 2 Only under the following conditions are no specified number of applications required except for the minimum of 10 applications from employed persons  
When the employer or directing head of any organization extends cooperation whereby the plan is fully presented to all or nearly all employed members in a manner mutually agreed upon
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- 5 Such employed persons may form a group of subscribers who likewise are employed in organizations having less than 25 employees
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- (2) The instruction should be at the collegiate level generally required of institutions giving similar curricula in the regional group
- (3) Since the teacher is the heart of an educational institution, the competence of the faculty, the organization of the faculty, the working conditions for the faculty and the quality of the instruction will receive special attention.
- (4) The physical facilities, including library must be adequate for the objective of the institution.
- (5) The administrative organization and personnel should be adequate for accomplishing the objectives of the institution
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The minimum requirements for an approved medical school as set by the statute and by ruling of the Approving Authority under the statute are as follows

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- (2) If the school confers degrees in medicine the school must be legally empowered to confer degrees in medicine
- (3) If the school confers degrees in medicine the school must see to it that the statutory conditions are fulfilled namely that the candidate shall have taken a course of at least four years of not less than thirty-two weeks in each year before the degree is conferred
- (4) If the power of the school to confer degrees is restricted under the charter the degrees conferred must be under the restriction of the charter
- (5) The school must restrict admission of candidates to those who have had at least two years of premedical work in an approved college including courses in physics, chemistry and biology
- (6) A candidate seeking admission to an approved school, after attendance in a nonapproved school must receive specific approval from the

Authority both as to admission and status after admission

(7) A candidate admitted to advanced standing must spend at least one year in the school completing the regular fourth or last year course of study if the four year course is given, or the year next preceding the year of internship, if internship is required for graduation before the degree is conferred. Before admission to such fourth year the candidate seeking admission to advanced standing must fulfill all the conditions required of candidates for admission to the fourth year who have taken the uninterrupted course.

(8) The administration of the school must be under the supervision and control of a dean or other administrative officer who is familiar with contemporary medical education, its standards and procedures, and who has authority adequate for the proper performance of his duties.

(9) The school must provide adequate preclinical courses in anatomy (including histology and embryology) physiology (including biochemistry and pharmacology) and pathology (including bacteriology and immunology). Average courses for these groups are approximately as follows: anatomy group 15 per cent of the whole medical course; physiology group 15 per cent; pathology group 15 per cent. The whole medical course should cover approximately 4 000 hours.

(10) For the preclinical courses there should be no less than nine full-time teachers of professional rank for anatomy group three, physiology group three, pathology group three. There must be adequate full-time or part-time assistants and technicians. This estimate is on the basis of fifty students in each class.

(11) In order that a teacher may be regarded as adequate for a full-time professorship (professor as associate professor, assistant professor) he must (1) have had adequate opportunity to become familiar with his subject; (2) have had adequate experience as a teacher of his subject; and (3) have attained such a position in his profession that he is recognized by his fellow workers in his specialty as competent.

(12) The laboratories for each preclinical subject must be adequate with ample desk room for work and locker room for supplies and equipment.

(13) Each department must have equipment adequate for its needs for demonstration purposes as well as for routine work with students for research by members of the faculty and there must be a sufficient number of rooms for meetings of whole classes for lectures or demonstrations with accessory apparatus for these purposes.

(14) There must be an adequate working library for the school, with books of reference and magazine files and tables or desks for work under the charge of a competent librarian.

(15) There must be adequate clinical material available for teaching purposes for all branches of

medicine, with especial emphasis on medicine surgery and obstetrics.

(16) The records of the school must be adequate to show the actual condition of the school, and the status of each student, including his premedical record.

(17) The financial statement of the school must be so presented as to show whether the school is or is not actually conducted in accordance with its charter as a noncommercial institution.

## CONNECTICUT NEWS

### VITAL STATISTICS

The birth rate in Connecticut for the first six months of 1936 was 125 per 1 000 population the lowest for a similar period in the last three years. A corresponding decrease in marriages for the same period was recorded, the total number dropping from over 5 000 to a little over 3 000. It is a debatable question whether this decrease in marriages resulted from the new marriage law effective January 1 and requiring blood Wassermanns on all applicants. The mortality rate for this six months period remained about constant at 10.9 per 1 000 population. During the month of June the total number of births recorded was 1 894, a rate of 13.2 per 1 000 population the lowest rate to appear for June in the last six years. The total number of deaths for the same month was 1 331 a rate of 9.6 per 1 000 population. Forty-seven stillbirths were reported for June with approximately equal sex distribution.

George R. Eckert, M.D., has been appointed health officer of New Fairfield to fill the unexpired term of Nathaniel B. Selleck, Jr., M.D.

### ATTORNEY GENERAL'S OPINION ON MARRIAGE LAW

The marriage license law as amended in 1935 Section 1595c Section 2 states in part that: "No application shall be accepted by such registrar until there shall be in possession of such registrar a statement or statements signed by a licensed physician." When the Attorney General's office was asked whether a Federal Medical Officer could make such certification it was stated that "physicians must be licensed to practice in Connecticut and a United States Medical Officer whether in the army, navy or public health service who does not hold a Connecticut license cannot issue a statement that will comply with the law as this work is not done while acting in the scope of his employment."

### SOCIAL SECURITY FUND GRANT FOR HARTFORD

Early in August the Health Board of Hartford received word that it had been allowed a grant of \$9 000 from funds set apart by the Social Security Act for the development of a national public health program. This section of the act is administered by the United States Public Health Association. Dr.

Benjamin G. Horning city health officer told the commissioners that this money would be used for the development of a constructive health program for the city. Immediately a new laboratory technician was hired. Among the duties of this new technician will be the testing of glasses, from taverns around the city, for bacilli. He will also assist in Wassermann and other blood examinations.

Dr. Horning had previously submitted a request for this money to Dr. Stanley H. Osborn, State health commissioner, who endorsed it and forwarded the request to Washington where it was finally approved. Although regulations provide that the details of the proposed health program must accompany the request for the grant, an exception was made in the case of Hartford as Dr. Horning, who had just been appointed health officer at the time he submitted the request, had not had the time to formulate such a program.

#### THE PROBLEM OF MEDICAL TESTIMONY

The Editor of the *Connecticut Bar Journal* devoted a large part of the August issue of that publication to the difficulties that the members of the medical profession are experiencing in the matter of expert testimony. Although Connecticut has a relatively small number of pleas of insanity in the criminal cases with which it has to deal, it has its full share of court cases in which the decision rests on whether the accused person was under the influence of liquor at the time of the crime, ordinarily an automobile accident.

To quote the Editor of the *Hartford Courant*: "The determination as to whether a person is under the influence of liquor is in many cases not easy. Even a test showing that a certain amount of alcohol has been consumed is not certain evidence of drunkenness for individuals vary widely in their tolerance of liquor. Yet physicians are frequently called on to give expert testimony as to whether a driver was intoxicated in borderline cases when another physician, equally skillful and equally sincere, might arrive at a contrary decision. Clearly the condition offers itself to easy abuse. Whether he is called for the defendant or for the State, a physician is under a strong if frequently unrecognized temptation to testify in favor of the side that employs him. A few doctors may let their friendships, their professional connections or their witness fees consciously affect their testimony, though the practice is certainly not so prevalent as has been charged. But whether the testimony is honestly given as in general it is, or is biased by the physician's personal feelings, it is always open to lay suspicion, unfair as that suspicion generally is. In the interests not only of the reputation of the profession but of removing the embarrassing situations in which its members too often find themselves, most physicians are heartily in favor of changing the system of giving expert testimony. But as to the exact nature of the changes, the pro-

fession is not in agreement. There it is that the legal profession can help the physicians. They seek a method of providing expert testimony in borderline cases that will remove the possibility of bias and personal prejudice. Difficult as the problem is to solve, it should not be impossible.

The first issue of the *Journal of the Connecticut State Medical Society* appeared a few days following the *Bar Journal* and by coincidence contained an article on "Medical Expert Testimony" by Dr. Thomas P. Murdoch, retiring president of the Society, as well as an editorial on this subject. In Dr. Murdoch's paper a plan was offered whereby the State Medical Society would submit to His Excellency, the Governor, the names of a group of doctors covering all the specialties in medicine. From this list of names thus submitted, the governor would appoint a desired number to be known as commissioners or referees of the superior court. From the approved list of referees the judge to sit in a particular case would select one to take medical testimony. The referee or commissioner would then submit his report to the court, after duly weighing the testimony on both sides; this report to be read as evidence to the jury.

Whether or not the plan as proposed by Dr. Murdoch is practical, it has set the members of the medical profession in Connecticut to thinking, and this in due time should result in action. Already the Editor of the new medical journal has received expressions of opinions from other members of the Society, evidence of interest on foot to remedy the present evil situation.

PAUL H. BROWN, M.D., health officer of East Haven, has joined the staff of the State Department of Health as an epidemiologist in the Bureau of Preventable Disease. Dr. Brown succeeds J. S. Cunningham, M.D., who will be on leave of absence for one year to attend the Harvard School of Public Health. Dr. Brown is studying at the Yale School of Public Health and will devote part time only to the State Department work.

Dr. Osborn, State Commissioner of Health, recently predicted that in a year or so Connecticut would lower its neonatal and infant death rate to an astonishing extent because of the forward step it has taken in the passage of its new marriage law. Investigation has shown that there are more than 2,000 cases of syphilis annually in Connecticut and that there are more cases among single men than there are among single women and also more among married women than among single women. By virtue of a compulsory Wassermann test on all applicants for a marriage license, it is expected that a closer control of cases of syphilis among single men and women may be established and a further reduction in congenital syphilis effected.

#### CHANGES AT THE HARTFORD HOSPITAL

Dr. Wilmar Mason Allen was appointed Director of the Hartford Hospital at a meeting of the Execu-

tive Committee held on September 18, 1936 Dr Lewis A Sexton, for twenty years superintendent of the hospital, obliged to relinquish his duties because of ill health, was named Director Emeritus and the post of superintendent was discontinued

Dr Allen who since 1925, has been pathologist and bacteriologist at the Hartford Hospital, was born in 1894 at Chattanooga, Tenn. He received his A.B. degree at Haverford College in 1916 and his M.D. degree at Johns Hopkins University School of Medicine in 1920. He interned at Henry Ford Hospital in Detroit from 1920 to 1921. From 1921-1922, he was director of the Central Laboratory in Saginaw, Mich., during which time he was also pathologist at the Saginaw General Hospital and St. Mary's Hospital. The new director of the Hartford Hospital was assistant resident and instructor in Johns Hopkins Hospital and Johns Hopkins University School of Medicine from 1922 to 1925. Then came his appointment as pathologist and bacteriologist at the Hartford Hospital, positions he held until his recent appointment. He is also consulting pathologist for the Newington Home for Crippled Children, Mt. Sinai Hospital and the Neuro-Psychiatric Institute and Hospital of the Hartford Retreat. Dr Allen is a member of the Hartford Medical Society, the Hartford County Medical Association and the Connecticut State Medical Society. He is a fellow of the American Medical Association, a fellow of the American College of Physicians and a fellow of the American Society of Clinical Pathologists.

Dr Sexton, who relinquishes the more arduous duties in connection with the management of the hospital, but who will still act in a consulting and advisory capacity, gained a national reputation as a hospital administrator during his service as superintendent. During his administration the number of beds at the hospital was increased from 400 to 780 and many new buildings were erected.

DR RALPH TOVELL has been appointed head of the Department of Anesthesia. He comes directly from the Mayo Clinic at Rochester, Minnesota, where he was chief anesthetist. Dr Tovell is a native of Sydenham, Ontario, and a graduate of Queen's University. He completed his postgraduate work in New York and Toledo, and was assistant professor of anesthesia at the University of Minnesota before becoming associated with the Mayo Clinic in 1929.

**STOLL**—HENRY FARNUM STOLL, M.D., of West Hartford, Connecticut, died suddenly of coronary thrombosis at his home on the morning of September 28, 1936. Dr Stoll began his practice in Hartford soon after completing his internship at the Hartford Hospital, following his graduation from the College of Physicians and Surgeons in New York in 1902. He was born May 25, 1878, in Port Jervis, N. Y., a son of Albert and Lizzie Farnum Stoll, and was graduated from Cornell University. During the World

War, he was a member of the faculty at Walter Reed Hospital in Washington, and was raised to the rank of major from a captaincy. He retired after his army service with the rank of lieutenant colonel, and returned to Hartford to resume his practice. Dr Stoll was a consulting physician for Wildwood Sanatorium, Newington, Windham County Memorial Hospital, Willimantic, Manchester Memorial Hospital, New Britain General Hospital and Bristol Hospital. He was a fellow of the College of Physicians, and held memberships in the city, county and state medical associations. He also was a member of the Twentieth Century Club and Lafayette Lodge A. F. & A. M. He leaves his widow, Eleanor Roberts Stoll, a daughter, Miss Hortense Stoll, of West Hartford, a brother, John Westbrook Stoll, of Espanola, New Mexico, and a sister, Miss Augustine B. Stoll, of Santa Cruz, New Mexico.

**BLACK**—ROSS E. BLACK, M.D., aged 56 years, one of New London's leading physicians for about one-quarter of a century, died suddenly at a New York hotel on September 27, 1936. Dr Black went to New York to visit for the week-end and it was expected that he would return to New London not later than Monday. It is known that the physician, who registered at a New York hotel, was apparently in excellent health when he departed from New London. His academic work was done at Juniata College, Huntington, Pa., his birthplace. He then received his medical training at Columbia University. Twenty-eight years ago, after he had been an intern at North Brothers Island Hospital and several other hospitals in and near New York, Dr Black started practice in New London. At that time he was a member of the staff of the Memorial Hospital.

Dr Black served as captain of a medical corps unit during the World War and was a member of the New London County and State Medical Associations. He was also on the board of directors of the Home Memorial Hospital Association and medical examiner for the town of Waterford. He was a thirty-third degree Mason and a member of the Harbour Club.

Dr Black married Laura Ellen Page of New London on April 3, 1913. He leaves his widow and small son, Ross Elliot, Jr., and a brother, Dr. John T. Black, former health officer of the city of New London, now a resident of Hartford.

#### MAINE NEWS

The fourth annual clinical session of the Maine Medical Association was held in Waterville October 15 and 16, 1936, with headquarters at the Elmwood Hotel.

Each day of the session was divided into four periods, and eight clinics were offered for each period.

Thursday evening the Kennebec County Medical Association held its regular monthly meeting the program of which consisted of a panel discussion of Poliomyelitis. This discussion was participated in



by a number of the leading authorities of the country, including Dr John A. Kolmer, Philadelphia, Professor of Medicine at Temple University, Dr Josephine B. Neal, New York, Professor of Neurology at Columbia University, Dr William L. Aycock, Boston, Assistant Professor of Preventive Medicine and Hygiene, Harvard University and Dr Arthur T. Legg, Assistant Professor of Orthopedic Surgery at Harvard.

The program for Friday evening, the 16th, was under the auspices of the State Association. Medical Economics, as applied to Maine, was discussed. This program represented the joint effort of the Committee on Medical Economics and the Maine State Planning Board and was the result, to date, of the survey being conducted by these groups in regard to medical conditions in the state of Maine.

At this meeting, for the first time, the State Association devoted an entire program to questions of medical economics.

Clinical demonstrations and conferences were held, during the mornings and afternoons of both days, at the Central Maine Sanatorium, the Elm City Hospital, the Sisters Hospital and the Thayer Hospital.

The clinics were apportioned between surgery, medicine, gynecology and obstetrics, tuberculosis, pediatrics, ophthalmology, otolaryngology and roentgenology, so that one might choose those subjects of interest. Men were assigned to the clinics in order of application and each group was limited to 15 men, to avoid overcrowding. Each clinic continued for 1 hour after which there was a half hour in session for discussion or going to the next selected clinic.

Luncheons were served at the Sanatorium and the Sisters Hospital. Clinics closed each day at 4:30 p. m. to allow for a social period at the Elmwood Hotel before dinner, which was served at 6:30 p. m.

The Council met each day at 12:15 p. m. The Fall meeting of the County Secretaries was held Thursday, October 15, at 5:00 p. m. The Editorial Board met at that time.

#### ANNOUNCEMENT OF PLANS FOR EXTENDING INFORMATION TO PHYSICIANS CONCERNING THE USE OF OFFICIAL MEDICINES

The therapeutically useful substances recognized by the Pharmacopoeia have been intended in each revision, to represent the most widely used medicines of that generation and decisions as to "admissions" and "deletions" early in each Revision, become one of the most important responsibilities of the Revision Committee.

During the last three revisions this feature has been particularly important since the medical profession, during that period, has revolutionized the methods for evaluating therapeutic efficiency and has been demanding satisfactory evidence of clinical value before accepting a new medicinal product.

In the current Revision this feature of the program has been especially emphasized and the Subcommittee on Scope has earnestly endeavored to

establish a list of official medicines which could be depended upon to represent the most advanced knowledge of therapeutics. The Scope Subcommittee has been equally determined that these be limited to dependable medicines and also that they cover every need of the physician, so far as such products are available.

With the publication of the Eleventh Revision, the Committee has authorized a program which subjects these decisions on scope to a most searching review, and at the same time provides for its prompt revision should that seem wise in the light of new information.

To carry out this program and at the same time widely extend authentic information to physicians concerning the use of official medicines, a special Committee was appointed which is now carrying out an intensive program through the wholehearted cooperation of the American Medical Association. Every feature of this program has received the approval of both the U. S. P. and the A. M. A. representatives before adoption.

It was decided that a series of articles presenting the therapeutic side of specific diseases or dealing with substances having similar physiologic activity, would be published in the *Journal of the American Medical Association*, an article to appear each two weeks for at least a year. When the first twenty-four titles had been selected after the study of fifty or more which had been proposed, the eighteen physician members of the U. S. P. Committee were invited to suggest the names of clinicians especially well qualified to prepare the articles. A half dozen or more names were suggested for each subject and from these one physician was selected by mutual agreement, to be invited to write the article.

Already eighteen of these completed papers have been received and submitted for review and approval to both the U. S. P. and the A. M. A. groups. Each article is to be about 3,000 words in length, corresponding to about five columns in the *A. M. A. Journal*.

It was further realized that unless some plan could be developed for more specifically calling the attention of physicians to these presentations than would result from their initial publication in the *Journal*, that they would largely fail to perform their purpose. Therefore certain additional features have been developed as outlined below.

An auxiliary Committee of professional pharmacists was appointed to assist in preparing a corresponding series of articles to go to the pharmaceutical press and also to plan a series of exhibits which would graphically call attention to each article. These exhibits are to be set up first in the headquarters of the Philadelphia County Medical Society at the same time that the medical article appears in the *A. M. A. Journal* and an illustration and description of these exhibits will be made a feature of each pharmaceutical article. These parallel pharmaceutical articles calling attention to the medical articles appearing on a specific date in the *A. M. A. Journal*, will be set up in advance by the

A *Ph A Journal*, reprints will be made, carrying a release date, which date will be the same as that of the medical article, and all Journals, which care to do so, can publish the pharmaceutical articles simultaneously. It will be sent to seventy or more pharmaceutical journals and it is hoped that many will regularly publish it under the caption of "The Pharmacopoeia" for the information and guidance of pharmacists throughout the country.

It is planned that reprints of the medical articles will also be made available through the office of the Chairmen of the U S P Committee on Revision, so that pharmacists can get these promptly to present regularly to their physician friends. These reprints will be punched and an attractive cover provided, so that by the end of the year the physician receiving the reprints from his pharmacist friend, each two weeks, will have a valuable text on therapeutics which he is likely to consider worth keeping and using. It is expected that each article will suggest a number of prescriptions and the pharmacist in presenting the reprint to a physician, can also leave with him one of the prescriptions suggested, filled in his own pharmacy, and illustrative of the professional qualifications of the pharmacist.

A feature of the plan also includes the ultimate publication of the series as a bound book to be thus made available to students in medical schools, to medical interns, and to physicians in practice.

It is also hoped that exhibits covering each article, will be made in many hospitals throughout the country, also at the headquarters of many County Medical Societies, and before state and national medical conventions.

An announcement of each article and a list of the therapeutic items recommended for the specific treatments discussed will also be made available to the manufacturers of medicinal products and they will be invited to cooperate wholeheartedly in making this program a success. Many of the official substances recommended for use in prescriptions must be made and supplied by our splendidly organized chemical and pharmaceutical laboratories, and these organizations should be prepared to meet the demands for these official products—*The Committee of Revision of the Pharmacopoeia of the United States of America*.

#### INSURANCE MEDICAL DIRECTORIES

The attention of all members is called to the following resolution adopted by the Society at the Hot Springs meeting April 29.

Whereas, certain commercial interests are publishing medical directories listing physicians by specialty and otherwise as available for insurance and compensation work, and other professional services and

Whereas participation by listing in these lay publications merely serves for the profit of the promoters, and is furthermore technically indirect solicitation of patients

Therefore, Be It Resolved That the Arkansas

Medical Society condemns these practices as unethical and forbids its members to continue listing their names in such directories, and

Be It Further Resolved, That the Arkansas Medical Society requests the House of Delegates of the American Medical Association to take similar action."

The resolution was presented to the House of Delegates of the American Medical Association and referred to the Judicial Council for study. The Judicial Council approved the resolution and recommended its adoption, which the House of Delegates did at the session of May 14, 1936.

The attention of our members has been previously called to the activities of these directory publishers. As is often the case individual physicians felt that they might incur a loss if they removed their names from such directories while other members retained their listing. With this thought in mind, the above resolution has been adopted. The practice of so listing is declared unethical no individual member may now feel that should he remove his name that another physician will accept that listing. The benefit is direct to these physicians in the fees saved the lost is entirely the promoter's.

Some idea of the financial gains involved in the publication of these directories may be understood when we state that one directory now on our desk contains the names of approximately 5,000 physicians. Ninety-two Arkansas physicians are listed in the three directories available to *The Journal*. The fee charged for listing in this one directory is \$15.00 per annum. A liberal estimate of the cost of publication and distribution is \$15,000. The balance \$60,000, is presumably divided between the promoter and his solicitors. Verily, a most altruistic motive prompts the publication.

#### ANOTHER DROP IN THE BIRTH RATE

For the first time in 10 years the American birth rate showed, in 1934, a rise over the preceding year. This encouraged the hope that the long period of falling birth rates had at last run its course and that the threat of an ultimately declining population, which is implied in the continued downward trend of the birth rate in the United States, might be on the way to being averted.

It now develops however that the slight increase in 1934 was only a temporary deviation from the general downward trend. For provisional figures now at hand for 1935 show that the birth rate has again taken a downward turn from a rate of 17.1 per thousand in 1934 to 16.8 in 1935. We are thus almost back to the all time low birth rate in the United States, which was 16.6 in 1933.

It is of interest to note what part the several States of the Union had in this general decline. Each of 33 states and the District of Columbia, comprising 59 per cent of the country's population, showed a fall in the birth rate. This group included every state with two exceptions, in New England and in the Middle Atlantic the West North Central and the

st South Central Divisions Six states comprising 20 per cent of the population, recorded no change in the birth rate from 1934 to 1935 This leaves nine states representing 21 per cent of the population which registered increases Three of these (Illinois Michigan and Wisconsin) were in the East North Central Division. Three others (Arizona Colorado and Montana) were in the Mountain Division. The remaining three to show rises were California Florida and Mississippi—*Statistical Bulletin Metropolitan Life Insurance Company* September, 1936

## RECENT DEATHS

**REYNOLDS**—EDWARD REYNOLDS M.D. of 321 Dartmouth Street Boston died at his home October 16 1936 He was born in Boston in 1860 the son of Dr John Phillips Reynolds who was Professor of Obstetrics at the Harvard Medical School from 1877 to 1886

After graduating from Harvard College, Dr Edward Reynolds entered the Harvard Medical School graduating therefrom in 1885 Dr Reynolds devoted his practice to Obstetrics and Gynecology and was one of the earlier students of the problems of sterility in women He was a facile writer and impressive speaker when dealing with the facts and theories relating to Obstetrics and Gynecology and his ability led to a teaching position at the Harvard Medical School and Staff positions at the Massachusetts General Hospital the Boston Lying in Hospital and the Boston City Hospital

He retired from practice in 1922

His Society affiliations were with the American Medical Association the Massachusetts Medical Society Boston Society for Medical Improvement and American Society for the Control of Cancer of which he was at one time vice-president and chairman of the board of directors He was also a member and past president of the American Gynecological Society and the Obstetrical Society of Boston

His clubs were the Tavern Club of Boston and the Harvard Faculty Club

He is survived by his widow the former Harriet Wolcott Parker of Boston two sons Edward Reynolds Jr of New York, and Dr George P Reynolds of Boston a brother Paul E. Reynolds of New York and three sisters Mrs William N Bulard of Boston and Lenox Mrs N P T Burke of Dover and Mrs Julian L Coolidge

**BLANCHARD**—WILLIAM BRADFORD BLANCHARD M.D. of 247 Concord Street, Framingham Massachusetts died at the Palmer Memorial Hospital October 16 1936

Dr Blanchard was born in 1880 graduated from the University of Maryland School of Medicine and College of Physicians and Surgeons in 1914 He had devoted his practice to ophthalmology otology laryngology and rhinology

During the World War he was a Lieutenant in

the United States Medical Corps He joined the Massachusetts Medical Society in 1923 and was also a Fellow of the American Medical Association

**COBB**—FREDERIC CODMAN COBB, M.D. a retired physician of Gloucester Massachusetts and Bradenton Florida, died October 11, 1936 at the Baker Memorial Hospital in Boston

Dr Cobb was born in 1860 and graduated from the Harvard Medical School in 1887

He joined the Massachusetts Medical Society in 1889 and retired in 1925

## NOTICES

### RESOLUTION RECOMMENDING THE APPROPRIATION OF ADEQUATE FUNDS FOR THE MAINTENANCE AND GROWTH OF THE ARMY MEDICAL LIBRARY'S BOOK COLLECTION AND INDEX CATALOGUE

The Medical Library Association comprising two hundred of the medical libraries of the United States and Canada assembled in its thirty-eighth annual session in St Paul, June 22 1936 notes with pleasure and pride the appearance of volume one of the Fourth Series of the *Index-catalogue* of the Library of the Surgeon General's Office United States Army (Army Medical Library) The Association records with satisfaction the abbreviations and changes in composition in this new volume effecting a saving of twenty per cent in space with accompanying reduction in cost

After a delay of three years during which no volumes of this *Catalogue* were printed, the appearance of this first volume of the Fourth Series gives renewed assurance of the continuation of this publication which, together with the Army Medical Library, is considered the outstanding contribution which our country and its Government has made to medical knowledge and

Whereas, The value and usefulness of the *Index-catalogue* is dependent upon the completeness of the files of medical publications contained in the Library of the Surgeon General's Office—a public national medical library the greatest in the world serving in its present form of administration with satisfaction the medical profession and the medical libraries of our country and

Whereas In recent years the annual appropriation of the Congress has been wholly inadequate to provide sufficient funds to acquire the current medical books and periodicals issued throughout the world so that they might be available for use throughout the country and for inclusion in the *Index-catalogue*

Therefore Be It Resolved That the Medical Library Association urges the Congress to appropriate annually to the Library of the Surgeon-General's Office an adequate sum for current medical books and periodicals and for the purchase of back publications lost during those recent years when the amount granted was grossly inadequate thus depreciating the completeness and usefulness of the

Library's collection, and an additional sufficient sum annually, for as many years as may be required, in order to make for the greatest possible completeness of the collection and its *Catalogue*, and

Be It Further Resolved, That a sum be appropriated annually to defray the cost of printing regularly each year not less than one volume of the *Index catalogue*, and

Be It Further Resolved, That a copy of these resolutions be spread upon the minutes of the annual meeting of this Association and sent to the President of the United States, the presiding officer of both houses of Congress, the Secretary of War, the Surgeon-General of the Army, and to the national state, and other medical periodicals with a request for publication, and to the members of this Association, urging the organization of which they are a part and all other medical associations and institutions to adopt similar resolutions to be sent to their local members of Congress requesting their support of these measures — Minutes of the Thirty Eighth Annual Meeting, Session of June 22, 1936 *Bulletin of the Medical Library Association* Vol 25 No 1, 12 (September) 1936

#### EXAMINATION OF STOOLS FOR AMEBIASIS

For many years the Department of Tropical Medicine of the Harvard Medical School has been making examination of the feces for pathogenic amebae when requested to do so by a physician. These examinations have been performed, in recent years, by Dr. L. R. Cleveland as protozoologist of the Department. Now however, Dr. Cleveland has been transferred to the Harvard Biological Institute at Cambridge. He will continue to make examinations and reports there, but, for the convenience of Boston physicians, the Department of Tropical Medicine has requested the Department of Comparative Pathology to continue the same kind of service at the Medical School. The work will be performed there in Building E<sup>11</sup>, Room 334, by Dr. Quentin M. Gelman, Assistant in Comparative Pathology.

RICHARD P. STRONG

#### DOCTORS BEWARE!

A report has been submitted to this *Journal* that doctors have been interviewed by an alleged salesman for a concern dealing in rubber goods. This man is reported to have collected money and not to have carried through his agreement with respect to the goods ordered.

#### MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p. m. on Thursday October 29, in the Amphitheatre of the Peter Bent Brigham Hospital Dr. Joseph C. Aub, Associate Professor of Medicine, Harvard Medical School and Senior Associate in Medicine, Peter Bent Brigham Hospital will give a

medical clinic. To it are cordially invited practitioners and medical students.

#### THE APPOINTMENT OF DR. ARTHUR BERK

Dr. Arthur Berk of 270 Commonwealth Avenue, Boston, has been appointed to the position of Assistant Professor in Psychiatry at the Tufts College Medical School.

#### UNIVERSITY EXTENSION COURSES

The following courses in mental hygiene will be given this fall under the joint auspices of the Massachusetts Society for Mental Hygiene and the State Division of University Extensions.

##### BOSTON

##### Keeping Mentally Fit

At the Gardner Auditorium, State House on Thursdays at 7 45 p. m., beginning November 12. This course will consist of eight lectures by men and women of high standing in their respective fields.

##### CAMBRIDGE

##### The Psychology of Adolescence

At Harvard Hall, on Mondays at 7 45 p. m. beginning November 2, Dr. Milton E. Kirkpatrick, Director of the Worcester Child Guidance Clinic, and Dr. Henry B. Elkind, Medical Director of the Society, will give four lectures each. While this course is primarily for teachers, those interested in the subject may attend.

##### SPRINGFIELD

##### Mental Hygiene in the Classroom

At the Classical High School, on Wednesdays at 7 30 p. m. beginning November 4. This is the professional course for teachers given by Dr. Elkind and Miss Henderson for the last two or three years. It is based largely on case discussion and is planned to give the teacher a better understanding of the behavior problems in her classroom.

Registration for any of these courses may be made at the first meeting or in advance at the office of the Division of University Extension, 217 State House, Boston.

#### NOTICES OF MEETINGS

##### MASSACHUSETTS SOCIETY OF EXAMINING PHYSICIANS

Massachusetts Society of Examining Physicians Fall Meeting Copley Plaza Hotel Boston, Thursday, October 29. Dinner at 6 30 p. m. \$2.50 per plate. Dr. Cassius H. Watson of New York, Medical Director of the American Telephone and Telegraph Company, and President of the National Safety Council will speak on 'Medical Aspects of Accident Control.' Discussion will be opened by Dr. Charles E. Mongan, President of the Massachusetts Medical Society.

B. A. GODVIN, M.D., President,  
W. M. P. COVES, M.D., Secretary

## HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheatre (Shattuck Street Entrance), Tuesday evening October 27, at 8 15 p m

### PROGRAM

#### Presentation of Cases

Cases of Attempted Suicide in a General Hospital  
By Merrill Moore, MD Associate in Psychiatry,  
Harvard Medical School

Medical students and physicians are cordially invited to attend.

MARSHALL N FULTON MD, *Secretary*

## TRUDEAU SOCIETY

FALL MEETING—NEW ENGLAND DEACONESS HOSPITAL  
THURSDAY, OCTOBER 29, 1936

### *Symposium on Nontuberculous Diseases of the Chest*

#### Operative Clinic

2 00 p m Drs Overholt, Betts and Eversole

4 00 p m Dr Hoover—Lung Abscess

4 15 p m. Dr Betts—Bronchiectasis

4 30 p m Dr Souders — Intrathoracic Tumors  
Nonradiosensitive

4 45 p m. Dr Hare—Tumors, Radiosensitive

5 00 p m Dr Lahey—Intrathoracic Goitre

5 15 p m Dr Eversole—Anesthetic Problems in  
Thoracic Surgery

5 30 p m Dr Overholt—Lobectomy and Pneu-  
monectomy

Demonstrations 5 45 p m

Oxygen Therapy

Indirect Bronchoscope

Continuous Suction for Chest Wounds or Spon-  
taneous Pneumothorax.

6 30 p m Dinner Palmer Roof.

MOSES J STONE MD., *Secretary*

## BOSTON PATHOLOGICAL SOCIETY

The October Meeting of the Boston Pathological Society will be held on Wednesday October 28 at 8 o'clock, in the Harvard Medical School, Amphitheater Building D

The speaker will be Dr E A. Codman His subject 'A Study of the Cases in the Registry of Bone Sarcoma of Giant Cell Tumor about the Knee,' (X rays will be on view in Room 202 after the meeting)

Medical students and physicians are cordially invited to attend

SIDNEY C DALRYMPLE, MD *Secretary*

## SOUTHERN MEDICAL ASSOCIATION

The thirtieth annual meeting of the Southern Medical Association will be held at Baltimore Maryland, Tuesday Wednesday Thursday and Friday, November 17 20

Physicians from the East, white members in good

standing of their state medical societies, are most cordially invited to attend the Baltimore meeting as visitors All scientific and social activities are available to registered visitors No registration fee

Any physician who would like to have a complete program may secure one by applying to the Southern Medical Association, Empire Building, Birmingham Alabama.

## MASSACHUSETTS SOCIETY FOR MENTAL HYGIENE

### ANNUAL MEETING

The Annual Meeting of the Society will be held on Tuesday November 24 at the Twentieth Century Club, 3 Joy Street Boston beginning with a luncheon at one o'clock

Dr Helen MacMurchy formerly Director of the Division of Child Welfare of the Federal Department of Health Ottawa, will be the principal speaker and will discuss Mental Hygiene and Child Welfare

## HEALTH DEVELOPMENTS IN MASSACHUSETTS

Health Developments in Massachusetts under the Social Security Program will be discussed at a meeting arranged by the Massachusetts Central Health Council to be held during the Massachusetts Conference of Social Work, on Saturday, November 7, at the Hotel Statler at 10 a. m The speakers and their topics will be as follows Massachusetts Health Program Development, by Dr Henry D Chadwick State Commissioner of Public Health The Child Hygiene Program, by Dr M Luise Diez Director Division of Child Hygiene The Program for Crippled Children by Dr Edward G Huber Assistant Director, Division of Administration

## SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK  
BEGINNING MONDAY OCTOBER 26 1936

### Tuesday October 27—

\*9 a. m - 10 a. m Boston Dispensary 25 Bennet Street Boston The Use of the X-Ray in the Diagnosis of Pulmonary Silicosis and Asbestosis  
Dr A W George Medical Aspects Dr Robert B Hunt

\*3 15 p m Harvard Medical Society Peter Bent Brigham Hospital Amphitheater (Shattuck Street Entrance)

### Wednesday October 28—

\*9 a. m - 10 a. m Boston Dispensary 25 Bennet Street Boston Hospital Case Presentation Dr S J Thannhauser

112 m Clinico-Pathological Conference Children's Hospital Amphitheater

\*8 p m Boston Pathological Society Harvard Medical School Amphitheater Building D

### Thursday, October 29—

\*9 a. m - 10 a. m Boston Dispensary 25 Bennet Street Boston Some Recent Work in Diabetes Mellitus Dr E A Grossman

2 p m - 6 30 p m Trudeau Society New England Deaconess Hospital

\*3 30 p m Medical Clinic Peter Bent Brigham Hospital Dr Joseph C Aub

6 30 p m Massachusetts Society of Examining Physicians Copley Plaza Hotel.

## Friday, October 30—

\*9 a. m - 10 a. m Boston Dispensary 25 Bennet Street Boston Parathyroid Disease Dr Fuller Albright

12 m Massachusetts General Hospital Clinical Meeting of the Staff of the Children's Medical Service Ether Dome

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\*10 a. m - 12 m Staff Rounds at the Peter Bent Brigham Hospital Conducted by Dr Henry A. Christian

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

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October 28—Boston Pathological Society See page 803

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March 30 April 2, 1937—First International Conference on Fever Therapy Postponement notice See page 52 issue of July 2

April 21 24 1937—American Society for Experimental Pathology See page 1075 issue of May 21

## DISTRICT MEDICAL SOCIETIES

## FRANKLIN DISTRICT MEDICAL SOCIETY

Will meet at the Weldon in Greenfield at 11 a. m. the second Tuesdays of November January March and May

CHARLES MOLINE M.D. Secretary

Sunderland

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January 13, 1937—Bear Hill Golf Club Stoneham

March 16 1937—Danvers State Hospital Danvers

May 11, 1937—Bear Hill Golf Club Stoneham

KENNETH L. MACLACHLAN M.D. Secretary  
1 Bellevue Avenue Melrose

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May, 1937—Annual Meeting. Details to be announced. The Secretary on behalf of the Society and its Executive Committee desires to express appreciation to the Physicians, Surgeons, Hospital Executives and others who have so kindly consented to assist us in connection with the above program.

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1247 Beacon Street Brookline

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November 11—Grafton State Hospital North Grafton Mass. 6 15 p. m. Dinner—complimentary by the hospital. 7 30 p. m. Business session and scientific program.

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May 6 1937—At 4 30 in the rooms of the Worcester Medical Library Inc. at 34 Elm Street Worcester will be held the spring meeting of the Board of Censors.

Wednesday Afternoon and Evening May 12 1937—Annual Meeting. Time and place for this meeting will be announced in an early spring issue of the Journal.

ERWIN C. MILLER M.D. Secretary  
27 Elm Street Worcester

## WORCESTER NORTH DISTRICT MEDICAL SOCIETY

October 28—Meeting at the State Colony Gardner 4 30 p. m.

# The New England Journal of Medicine

VOLUME 215

OCTOBER 29, 1936

NUMBER 18

## The Massachusetts Medical Society

### SECTION OF OBSTETRICS AND GYNECOLOGY

Municipal Auditorium, Springfield, June 8, 1936

#### PRESIDING

Dr Charles J Kichham Brookline Chairman  
Dr Raymond S Titus, Boston Secretary

**CHAIRMAN KICKHAM** We will call the meeting to order, gentlemen. After talking the matter over with the Secretary and also with the gentlemen who are going to read papers it has been decided that we will reverse the order of procedure by having Dr Schumann's paper second instead of first. May I say that we are happy to have as large an audience as we have here today. We know that those who are attending will go away with most worthwhile information from these various gentlemen. As this will mark the termination of my activities as Chairman of the Section I wish before the meeting starts to express my appreciation of the hard and earnest cooperation of the Secretary Dr Titus as well as that of Dr Bowers of the *Journal*, for his constant cooperation and suggestions in regard to the column. As all of you gentlemen know it is the only Section of the Massachusetts Medical Society—in fact, it is the only Section that I know of any Medical Society in the country—that functions throughout the year. We carry on not only by having talks from time

to time before various medical societies but there is a column printed in the *Journal* every week under our auspices carrying papers that are written by individuals who have given a good deal of thought to the particular subject discussed so that we really all get a Postgraduate Course in Obstetrics and Gynecology. This year I went before the Committee on Finance and they very kindly consented to give us sufficient funds to print the various articles that have been published from October to June and these are in pamphlet form and will be distributed free of course to the doctors present. I think it will be well for those who receive them to keep them because you can refer to them. I know with great pleasure and also with profit in the year to come. If you have a particular friend who is not here who would like one we shall be glad to have you take two in order that he or she may have one. We will now proceed with the meeting.

The first paper this afternoon will be "Menorrhagia and Metrorrhagia of Benign Origin in Women Under Forty-Five Years of Age with a Plea for More Conservative Treatment." The paper will be presented by Dr Frederick L. Good of Boston, Professor of Obstetrics at Tufts College Medical School, Surgeon-in-Chief Boston City Hospital and Gynecologist, St Elizabeth's Hospital.

### MENORRHAGIA AND METRORRHAGIA OF BENIGN ORIGIN IN WOMEN UNDER FORTY-FIVE YEARS OF AGE, WITH A PLEA FOR MORE CONSERVATIVE TREATMENT\*

By FREDERICK L. GOOD, M.D.†

**T**HE title of this paper as listed in the program is "Menorrhagia and Metrorrhagia of Benign Origin in Women Under Forty-Five Years of Age, with a Plea for More Conservative Treatment." I have taken the liberty, however, to discuss the subject without any age limit, realizing that menorrhagia and metrorrhagia are frequent and troublesome symptoms in women beyond the age of forty-five years.

If there is a prolonged or a profuse flow at the time of a menstrual period the condition is called menorrhagia. If the flow is between the periods, the condition is called metrorrhagia. One is very apt to suffer from menorrhagia and metrorrhagia if there exists a hyperplasia of the endometrium. A good and simple

definition of "hyperplasia" is that it is "an overgrowth of a part due to a multiplication of its elements." I feel that there will be a better understanding of this subject if one bears in mind these simple definitions.

Of late, much has been written about the treatment of menorrhagia and metrorrhagia by hormones and anyone who takes the time to read will quickly find out that there is no unanimity of opinion as to the therapeutic value of the various hormone preparations. I feel that the greatest advance in gynecology during the past few years has been along the lines of endocrinology and that many of our unsatisfactory results may have been due to the fact that we have been using hormones indiscriminately, and have not made, in many instances, the necessary laboratory studies before advising hormone treatment. I feel, too, that many clinicians have taken altogether too much for granted and clin-

Read at the Annual Meeting of the Massachusetts Medical Society, Section of Obstetrics and Gynecology, Springfield, June 8, 1936.

†Good, Frederick L.—Professor of Obstetrics, Tufts College Medical School. For record and address of author see *This Week's Issue*, page 845.

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operation she has had perfectly normal periods and her general physical condition is excellent

I feel that the successful outcome of this case is due almost wholly to the excellent work done by the endocrinologist. This case shows not only how necessary it is to have the proper endocrinological study, but also how futile are our efforts in many instances when all we do is simply a dilatation and curettage. Let us constantly bear in mind that you cannot cure pituitary, ovarian thyroid or adrenal dysfunction by removing the uterine endometrium. We should first find out the causative factor and treat the case accordingly. We should never treat solely the result of the causative factor

CASE 2 I have under my care at the present time a patient, 47 years of age who is suffering from both menorrhagia and metrorrhagia. Her blood picture remains fairly constant with a hemoglobin of 85 to 90 per cent and a red blood count of about 4,500,000. She is also suffering from a marked vascular hypertension. I referred her to an internist in order that I might receive a medical opinion as to how I should proceed with treatment. I wanted to know if her marked hypertension was a contra-indication to any procedure and, if not whether I should treat the patient by operation or by radiation. The internist reported that the menorrhagia and metrorrhagia might well be looked upon as a blessing in disguise and that possibly her flowing might mean the difference between a fairly comfortable existence for some few years to come or perhaps a cerebral hemorrhage and that furthermore a not too profuse flow might serve the purpose of keeping her blood pressure relatively low. Neither the internist nor I intend to allow this patient to flow for years but we are hopeful that within a comparatively short time she will have a normal menopause which would certainly be a better result than could be obtained at the present time by operation, radium or x-ray.

In the two cases which I have discussed I have stressed the fact that I did not advise a dilatation and curettage. I do not wish to give the impression that that is my opinion in every case because I feel very strongly that a diagnostic dilatation and curettage or a biopsy should be done whenever there is even the slightest suspicion that the menorrhagia or metrorrhagia may be due to carcinoma of the fundus or carcinoma of the cervix. If we are to lower our all too high mortality from carcinoma of the cervix and carcinoma of the fundus it can be done only by making an early diagnosis, and the only way to make a positive early diagnosis is by a diagnostic dilatation and curettage or by a biopsy. I feel, too, that a dilatation and curettage to be of the greatest help should be done in a hospital or, if done at home, should be done under an anesthetic and the whole cavity of the uterus properly explored. In recent years there has been a tendency on the part of some to use a so called "suction curet" for diagnostic purposes. I feel that it is quite possible in using this instrument for one to obtain perfectly healthy endometrial tissue from one part of the uterus and yet miss another part of the uterine cavity which may show a marked diseased condition. Because of this fact I think it better

to do a thorough and complete curetting of the entire uterine wall.

Menorrhagia and metrorrhagia are many times outstanding symptoms in cases of pelvic inflammation and in cases of ovarian and uterine tumors. Many times a dilatation and curettage in cases of this type does absolutely no good and may do harm. Pelvic inflammation, ovarian tumors, extrauterine pregnancies, tubal abortions and fibroid tumors may all have menorrhagia and metrorrhagia as the outstanding symptoms and cannot be cured by a dilatation and curettage but must be treated by laparotomy.

Hyperplasia of the endometrium occurs very frequently at the time of the menopause and with it, of course, one has menorrhagia and metrorrhagia as outstanding symptoms. The question often arises as to the best method of procedure in such cases. If they do not yield to simple treatment should they be treated by hysterectomy or by radium or by x-ray? I feel that many times cases of this type are treated by hysterectomy when they might well be treated by radium and deep x-ray therapy. The proponent of hysterectomy is very apt to tell you that the patient has passed the child-bearing period and that whereas he would not consider hysterectomy in a younger patient, he feels that it is the better treatment in a patient 45 years or over. He forgets, however, that every time the abdomen is opened there is a possibility of general peritonitis, blood stream infections, post-operative pneumonias, emboli, as well as other less serious complications and that the patient is an invalid for a period of from four to six weeks. On the other hand, after a diagnostic dilatation and curettage has been done, radium may be inserted with a hospitalization of only a few days, or deep x-ray therapy may be given in the office of the roentgenologist. To be sure there is a slight possibility that unlooked-for complications may result in cases treated by x-ray or radium, but the possibility is not nearly so great as in those cases treated by laparotomy. Certainly from the economic viewpoint many of these cases would be better treated by radiation and deep x-ray therapy. The same opinion also applies to certain cases of fibrosis and let it be understood that I draw a distinctive line between the diagnosis of "Fibrosis" and "Fibroid Tumors". I would advise hysterectomy in cases of fibroid tumor (except a very small one), and I would advise radium and deep x-ray therapy in not too marked cases of fibrosis.

One of my medical friends who is also interested in pathology (for obvious reasons I can not mention his name) has told me that he often wonders why hysterectomies, salpingectomies, and oophorectomies have been done on many patients whose organs he has seen after their removal. He once facetiously inquired if the

ically have gone farther with the use of various hormones than laboratory work actually warrants. A good rule to follow is to keep pace with the laboratory worker and not to take anything for granted until the laboratory has been able to prove definitely the efficacy of a particular hormone in a particular condition.

It is safe to say that if a patient complains of flowing at her regular period for a longer time than she has been accustomed to call normal, or if she flows between her periods, the treatment most often advised is a dilatation and curettage. This operation is advised all too often when no adequate study has been made of the case and when one does not know what is really the cause of the menorrhagia and metrorrhagia.

A patient may have a hyperplasia of the endometrium and as a result of this condition suffer from both menorrhagia and metrorrhagia and yet many times may require nothing but the simplest treatment. We cannot always take the word of the patient that her flow has been profuse or that it has been prolonged. It is much better to try to determine the severity of the flow by making a careful blood examination, thus finding out whether the flow has been sufficient to have caused even a mild secondary anemia. If a patient states that for one year she has flowed profusely for eight days and that up to that time her periods lasted but four days and that the amount previous to a year ago was much less than at present, one rightfully arrives at the conclusion that there is some abnormality of menstruation. But if a blood examination shows a hemoglobin index of between 90 and 100 and a red blood count of about 5,000,000 we certainly should not be unduly alarmed by the patient's history. Such cases are many times amenable to a simple tonic treatment.

With metrorrhagia the picture is somewhat different and usually there is an organic cause for the patient flowing between her periods. But many times, questioning will reveal that what the patient has called "flowing" is really no more than a slight "staining" and may be due to a mild endocervicitis, a condition that many times may be easily and readily corrected in the physician's office by local treatments. A complete blood picture in this type of case is also essential before any particular line of treatment can be recommended.

Many cases of uterine hyperplasia are due to a pituitary or ovarian dysfunction, and a dilatation and curettage is going to result in nothing more than the removal of the diseased endometrium. If the pituitary and ovarian dysfunction are not properly studied and treated, there will be a return of the hyperplasia within a very short time. In other words, many times we do absolutely nothing but treat the end-result of the dysfunction and neglect en-

tirely the etiologic factor. Every one of us has done numerous dilatations and curettages in past years, when we were ignorant of the part played by the endocrine glands and every one of us can look back and recall numerous cases which were not helped in the least and now we know the reason why. With our increased knowledge of the causes of menorrhagia and metrorrhagia let us make sure that the case is really surgical, and not wholly medical, before we advise even this simple procedure.

Many will say that the average gynecologist or general practitioner of medicine has not been sufficiently well trained to decide what, if any, endocrine disturbance may be the etiologic factor in cases of menorrhagia or metrorrhagia. I will agree to that statement almost in its entirety and will say that although I am a gynecologist, nevertheless, I refer many so-called gynecological cases to the endocrinologist.

CASE 1 Within the past year I have had referred to me a young girl about 18 years of age who, because of menorrhagia and metrorrhagia, had been twice curetted by a most competent surgeon. The result in each instance was the same, that is, a few weeks after the patient's discharge from the hospital she started to flow again and felt that the dilatations and curettages had done her absolutely no good.

Examination showed her to be a well-developed and well-nourished young girl with a moderate secondary anemia. I knew the surgeon who had operated on her and also knew that he could do a dilatation and curettage just as well as anyone else. I made up my mind that if this very competent surgeon could not give the patient relief by two curettages, the result would probably be the same if I advised a third. I referred the patient to an endocrinologist who after making the necessary studies of the pituitary ovary, thyroid, and other indicated organs decided that the case was a proper one for treatment with antuitrin S. Within a comparatively short time the patient's menorrhagia and metrorrhagia were cleared up—cleared up to such an extent that the girl's excessive flowing was followed by amenorrhea. After three months of amenorrhea her constant flowing returned and the patient was referred back to me for another pelvic examination.

Under ether anesthesia it was found that the uterus was somewhat smaller than normal and that the vaults were free. The examination revealed nothing that would warrant surgical interference. To be sure she was still flowing which might have been sufficient indication for curettage were it not for the fact that on two previous occasions she was not helped by this procedure. After further study the endocrinologist made a diagnosis of a small cystic ovary and expressed the opinion that it was this condition that caused the patient to suffer from both menorrhagia and metrorrhagia. If she had an ovarian cyst it was necessarily a small one, so small, in fact that it could not be felt on examination.

Finally an exploratory laparotomy was performed at which time it was found that the uterus was somewhat smaller than normal and one ovary normal. The other ovary was not much enlarged but was nothing but a cystic shell. A unilateral oophorectomy was performed and before the patient left the hospital she had stopped flowing. Since her

was not mentioned I call to mind a purely hypothetical case. In a hospital with but one Elliot machine and a number of patients to be treated in adjoining beds at the same time. The nurse left the room for a few minutes and when she returned the air was blue with profanity. During a comparison of pelvic notes between the patients it had developed that one was the wife, and the other the stenographer of the same gentleman and each was accusing the other of being the source of her own infection. I would like to ask Dr Good if he would consider the Elliot treatment radical or conservative in this particular instance?

I like the quadrumvirate which Dr Good has assembled for the effective handling of this gynecological difficulty—the radiologist the internist the endocrinologist and the gynecologist—and I agree that their several efforts should effectively combine to stanch the flow in the most conservative way.

**CHAIRMAN KICKHAM** The next formal discussion will be opened by Dr Edward L Kickham of Boston.

**DR. EDWARD L. KICKHAM, Boston** Mr Chairman I am sure that we all enjoyed the excellent paper of Dr Good not alone because of the sound advice and excellent procedure suggested but also in the consideration of such common and fundamental gynecologic problems as menorrhagia and metrorrhagia, he has brought to our attention some of the faults in their treatment which may be all too prevalent.

It does not seem possible that in the light of our present knowledge repeated dilatation and curettage should be done for the regular or irregular bleeding described as menorrhagia or metrorrhagia. Yet we will all have to agree that occasionally in taking histories this fact is disclosed.

I can only mention, with emphasis the necessity for a diagnostic dilatation and curettage in these cases almost regardless of age and the value of the pathological report which is most important. With the occurrence of malignancy apparently increasing and the age of incidence being lowered this point is essential to the proper conduct of future treatment.

As to the endocrines in these conditions I believe as the speaker has said that we have advanced in this field and it promises much for the future but there is such a lack of unanimity of opinion such a variety of products such a shotgun type of treatment suggested and such an unexpected eventful and sometimes uncontrollable result obtained that I fear we are expecting too much and in so doing may sacrifice our well grounded gynecological principles especially clinically.

I would like to call attention to the suggestion of the speaker in regard to subinvolution of the uterus following delivery as a frequent cause of menorrhagia and metrorrhagia. There has been in recent years a tendency to discharge patients early or allow them to be out of bed earlier than formerly. This has been due in a large sense to the economic problem of hospitalization or if at home to employment of help. I have noticed especially in the clinic a tendency toward an increase in the number of cases of subinvolution. We know that time alone will help this situation and that sufficient time should be spent in bed.

The question of the use of radium or deep x-ray as against hysterectomy is certainly an important one and is more or less controversial. I will have to agree that I believe there are many more hysterectomies being done than are necessary. I am speaking especially of women from 30 to 45. The dif-

ference of opinion seems to revolve about the effect on and the value of the ovaries in these women. In the cases treated with radium or x-ray there is likely to be an effect on the function of the ovary, although in the hands of expert roentgenologists and radiologists with accurately estimated dosage this is minimized and the patient may be carried to natural menopause by small repeated doses which will control excessive bleeding but still allow the function of the ovaries. In hysterectomy we have positively controlled the hemorrhage with no effect on the ovaries or relatively little, but in doing this we have prohibited future pregnancies, which in many of these women is important. I am inclined to advise conservative treatment in the average case, since the radical course can always follow if necessary.

**DR. BENEDICT F. BOLAND, Boston** I think we all appreciate the excellent paper that Dr Good has read this afternoon as it is really a textbook synopsis of these conditions condensed into simple and salient facts.

First of all I am in full accord with what Dr Good has said about dilatation and curettage. His reference to performing biopsies in the hospital I feel is excellent judgment. The tendency to acquire biopsy material with a curet as an office procedure may be satisfactory in an occasional case, but its universal employment may often fail to produce adequate material and a malignancy may be missed. Personally I am of the opinion that when a biopsy is indicated the hospital is the place to perform it.

The use of some type of cautery has been advocated in the treatment of some of these lesions. I appreciate that many cervixes which in the past have had mutilating and extensive surgical procedures and also many abnormal cervixes especially in women of child bearing age are treated by some form of surgical diathermy with less destruction and better results. However I feel that the employment of this agency demands a careful attention in technique and discriminating judgment in its application. The use of heat in the form of cautery is contra indicated during an acute cervical infection or in the presence of an acute or subacute salpingitis, for it may produce a parametric infection, pelvic abscess or peritonitis.

Use of the electrocautery in the treatment of diseases of the cervix uteri is far from being a harmless procedure. The feeling has become general unfortunately that no complications need be feared in the routine use of the cautery. The ease with which the method may be applied and the excellent results obtained almost universally have had the effect of minimizing any apprehension on the part of those employing cautery. Abnormal epithelium is destroyed, deep infection is checked, followed in the majority of cases by epithelialization of the cervix and complete cure of the lesion without surgical operation or prolonged treatment. Reticence in discussing unfavorable results has perhaps tended to conceal the true incidence of complicating cellulitis. This danger is increased in cases of displacement where there is interference with good mechanical drainage from the uterus and where necrotic material stagnates within the uterine canal. Patients with a history of an infection associated with an abortion especially of recent occurrence are bad subjects for cauterization. The use of the colposcope, an illuminated vaginal speculum and focusing telescope which has the magnification of ten times the human eye and which permits the diagnosis of inflammatory changes in the mucous membrane of these cervixes is helpful. It permits an early diagnosis of leukoplakia which

old order of things had been changed, that he knew appendices were being removed routinely when the patient was operated upon for another condition, but he was beginning to wonder whether some were now removing the uterus, tubes and ovaries routinely as part of an operation for an acute, subacute or chronic appendicitis. He remarked that the only sign of disease he saw in the removed organs was in the appendix. That remark was made facetiously, of course, but, nevertheless, conveyed an implication that some of us were treating cases surgically that might well be treated by radium and deep x-ray therapy.

Radium and deep x-ray therapy may be better treatment in comparatively young patients than is hysterectomy. Although one must bear in mind the possibility that menstruation may never return if a patient has been treated by deep x-ray or radium, we all have seen many patients who after a lapse of two or three years have had a return of the menses, a result certainly to be desired. On the other hand, if the uterus or ovaries are removed, there will be no return of the menstrual function and no further possibility of pregnancy. I am not advocating radium or deep x-ray therapy for all cases but am advising that one should conscientiously decide which is better in each particular case. Certain cases of endometritis, certain cases of fibroids and all cases of carcinoma of the cervix are better treated by radium and deep x-ray therapy than by operation. Carcinoma of the fundus, I feel, is best treated by radiation first and then hysterectomy. The uterus with multiple fibroids or the uterus with one large fibroid is better treated by hysterectomy.

Prophylaxis is as important in the treatment of menorrhagia and metrorrhagia as it is in every other branch of medicine. Obstetric patients should not be allowed to get out of bed if they are still flowing freely or if, on examination, there is considerable subinvolution. I feel that the obstetric patient should be treated routinely with an oxytocic and hot vaginal douches during her last four or five days in bed. The patient with a properly involuted uterus is less apt to suffer in the future from menorrhagia and metrorrhagia than is the patient who arose from her bed with a marked subinvolution or with free bleeding. Obstetric patients should be examined routinely three weeks, six weeks and ten weeks after delivery, and, if an erosion or endocervicitis is found, the condition should be properly treated by diathermy, operation or topical applications. If the obstetric patient is given the same careful treatment postpartum that she receives antepartum there will be less tendency toward menorrhagia and metrorrhagia during the succeeding years of her life.

In conclusion I wish to emphasize what I consider to be important points

1 Always do a diagnostic dilatation and curettage or a biopsy if there is the slightest suspicion of malignancy.

2 Never do a dilatation and curettage until the proper endocrinologic and medical studies have been made in each case, unless, of course, there are positive local signs to explain the symptoms of menorrhagia and metrorrhagia, such as mucous polyps or retained products of conception.

3 Many cases now being treated surgically might well be treated by radium and deep x-ray.

4 Prophylaxis. Prevent so far as possible the occurrence of menorrhagia and metrorrhagia by giving the proper care to an obstetric patient during her postpartum period.

### DISCUSSION

CHAIRMAN KICKHAM. Before opening the formal discussion I wish to thank Dr. Good for a delightful paper, one that has certainly covered the ground thoroughly in the field chosen for his subject. I wish to ask whether the gentlemen in the back of the hall were able to hear clearly through this microphone. I also wish to state that all papers will be open for discussion by any lady or gentleman present. In fact, the more discussion we have, the more questions asked, the more interesting it will be. Do not hesitate. We are all doctors and we know we are not all good speakers, so do not hesitate to ask any appropriate question. I request when anyone rises to speak that he kindly announce his name so that the Secretary can record it, because the proceedings will be published later.

The discussion of the paper just read will be opened by Dr. Edgelow but before opening the discussion—having just glanced toward the back of the hall and noticed that the founder or father and most important member of our Section of Obstetrics and Gynecology the present President of the Massachusetts Medical Society Dr. Mongan is at the back of the hall—may I ask the gentleman beside him to escort him to the platform (Dr. Mongan was escorted to the platform). As you are all aware, in this particular Section—in fact throughout the State, but especially in this particular Section—we really have a deep affection for Dr. Mongan.

The formal discussion will be opened by Dr. Arthur F. G. Edgelow of Springfield. Dr. Edgelow has been called out so Dr. Palermo will open the discussion.

DR. ALFONSO A. PALERMO, Springfield. I had the pleasure of reading Dr. Good's paper, some days ago, and now of hearing it and I have been impressed with the sound common sense it contains.

'Conservative' is a hard word to define, but as Dr. Good uses it, it is apparently synonymous with the word best. In a patient bleeding beyond the menopause with curettings showing no malignancy, radical treatment with radium or hysterectomy, might be considered more conservative than worrying along for weeks or months with hormones only to resort to the former treatment in the end. In the case of Dr. Good's hypertensive patient who at 47, is having menorrhagia and metrorrhagia, I would like to know what her endometrium shows now rather than wait for one or two years. In spite of her excellent blood picture I should prefer a conservative dilatation and curettage to radical inactivity.

In dealing with abnormal bleeding associated with pelvic inflammation, the Elliot method of treatment

treated with cautery I am mindful of that fact and also that the worst case of pelvic inflammation that I have ever seen followed a dilatation and a curetage on a patient who was suffering from hyperplastic endometritis. Regardless of the possibility of pelvic inflammation due to cauterization, I still feel that cases of endocervicitis, and not endometritis, are better treated by cautery or topical applications.

I have been very much interested in the comments of Dr Parvey and think what Dr Parvey has said demonstrates the truth of my statement that few of us know enough about the different hormones to draw our own conclusions and that it is far better to refer each and every case to the endocrinologist for further study.

CHAIRMAN KICKHAM Thank you, Dr Good.

We have been very fortunate to have at least one gentleman as a guest from outside our own environ-

ment, who will speak to us. I think, on this particular occasion I cannot speak too fulsomely about the gentleman who will address us next. He has the reputation, as you know, of being not only a great surgeon but a perfect gentleman and a good fellow thrown in. I think we are very fortunate in being able to have Dr Schumann come all the way from Philadelphia to speak to us on a subject that is not only interesting to us but a subject that he has made a particular study of, and therefore, what we will hear is really the latest authoritative opinion on the subject that he will present. It gives me great pleasure to present to you Dr Edward A. Schumann of Philadelphia Professor of Obstetrics, University of Pennsylvania School of Medicine Surgeon-in-Chief, Kensington Hospital for Women, Obstetrician and Gynecologist, Philadelphia General Hospital who will present 'Observations Upon the Hemorrhage of Pregnancy' Dr Schumann.

## OBSERVATIONS UPON THE HEMORRHAGE OF PREGNANCY\*

BY EDWARD A. SCHUMANN, M.D.

**T**HE three major causes of maternal death during pregnancy and labor, are in order of frequency, sepsis, toxemia and hemorrhage. Bleeding of varying severity may occur at any time during pregnancy, labor, or the puerperium, and is often associated with some defect in the implantation of the placenta, although it may have other sources.

The etiology of bleeding during pregnancy varies with the period of gestation, and, for the purpose of diagnosis, it is well to consider pregnancy in its three trimesters and to classify the causes of hemorrhage in each according to their relative frequency.

In the first three months, by far the most common cause of uterine bleeding is threatened or inevitable abortion, the second is ectopic pregnancy. These two account for more than four-fifths of all hemorrhages. Next in point of frequency are hydatidiform mole, persistence of menstruation, menstruation from one horn of a double uterus, uterine polyps, cervical erosion or carcinoma, all of which are uncommon.

Although the classical picture of abortion shows pain, hemorrhage and dilatation of the os, it is noteworthy that in many instances painless bleeding may persist for several weeks, before complete separation of the ovum or its death inaugurates uterine contraction with the development of the other two elements of the syndrome.

Hemorrhage in abortion may be furious, with rapid exsanguination of the patient, but I have never yet seen a fatality with this accident which could be ascribed to hemorrhage alone.

When infection occurs, the prognosis among women with severe anemia becomes very grave, but bleeding without infection is rarely a cause of death.

The diagnosis of abortion with hemorrhage may be made by the elicitation of the signs and symptoms of pregnancy in the first trimester, plus the findings of some degree of dilatation of the cervix on bimanual examination and the history of pain and bleeding. If fragments of decidua or placenta are found, the evidence is conclusive. The most important condition with which uterine abortion may be confused is ectopic pregnancy and the differentiation of these conditions is often difficult.

The classical picture of ruptured ectopic pregnancy—sudden catastrophic pain, with fainting and collapse, is seen in slightly less than half of all cases, the more common symptoms being a dull but increasing abdominal pain, rigidity of the recti muscles, slight elevation of temperature and a moderate or high leucocytosis. Associated with these symptoms is vaginal hemorrhage, which although it may at times be fairly profuse is never violent. Indeed, one of the valuable signs for differentiation is the fact that the woman suffering from ectopic pregnancy may, and frequently does show the effect of severe blood loss, although the visible hemorrhage is negligible, whereas in intrauterine abortion, the evidence of anemia is in direct ratio to the visible amount of blood.

The history in these cases is also most important from a diagnostic standpoint. In abortion, there is complete amenorrhea, with the associated subjective signs of pregnancy—nausea and vomiting, polyuria, pain and tingling in the breasts and increased vaginal secretion. In ectopic pregnancy the signs of pregnancy are vague, usually, at least not so pronounced as

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\*Schumann, Edward A.—Professor of Obstetrics, University of Pennsylvania School of Medicine. For record and address of author see This Week's Issue, page 540.

cannot be diagnosed by palpation. Observers differ on the time it takes to develop into cancer but since these cases do become cancerous, leukoplakia must be considered a step in its development. The colposcope is indispensable in Lugol's iodine reaction test. One of the speakers has made reference to the Elliot treatment. Years ago when this treatment was in its infancy, I was chosen by the Gynecological Staff of the Boston City Hospital to undertake an investigation as to the merits of this method. The Elliot treatment has some value, but is limited and strictly a hospital procedure. It is effective in inflammatory lesions. Heat to the pelvis can be raised from 98° to 130° F. Cervical discharge is promoted and after an application of one half hour, the cervix takes on a tissue-paper consistency and is very friable. It is contraindicated in fibroids because it promotes bleeding. Therefore I would object to its use in menorrhagia.

Dr Good has mentioned fibrosis of the uterus, but has not differentiated the size of the uterus in which he uses x ray and radium. I have used x ray in that type of fibrosis of the uterus only when it is normal or slightly larger than normal. Those cases of the two and three months size do not appear to react well. Occasionally a case of this type is aggravated by the use of radium. Will Dr Good kindly explain in what type of uterine fibrosis he applies x ray and radium therapy?

DR BENJAMIN PARVEY Boston I am extremely grateful to Dr Good for mentioning that the laboratory study is important in menorrhagia and metrorrhagia, as well as amenorrhea. We know that menorrhagia and metrorrhagia are usually due to an excess of female sex hormone secretion in the blood stream. In the majority of cases curettage would not be necessary, since quantitative analysis of urine would undoubtedly show an excess of this hormone. Kurzrok has demonstrated experimentally that a normal menstruating woman excretes 10 to 20 rat units of female sex hormone per liter of urine in 24 hours. The lesser amount is found after menstruation and the greater at the mid menstrual or ovulation period. The presence of an excess of female sex hormone beyond 20 rat units is an indication of an overstimulated ovary. Such cases can be treated by hormonal therapy. Up to the present time cases of either menorrhagia or metrorrhagia were treated with antuitrin S or Follutein taken from pregnant urine. Mazer of Philadelphia found that by using the 'growth hormone', the whole gland in addition to antuitrin S better results were obtained. The rationale for such therapy is found in an analysis made by Kurzrok of the relative proportions of the amounts of pituitary A and B in Follutein and the growth hormone.

Follutein (Squibb)	} — A P H <	A 7 parts
Antuitrin (P & D)		B-3 parts
Growth Hormone Extract (Squibb)	} — A P H <	A 2 parts
Antuitrin G (P & D)		B 8 parts

The A element is the graafian follicle stimulating factor and B is the luteinizing. Since menorrhagia and metrorrhagia are due to an excess of pituitary A it is obvious that the combination of antuitrin S or Follutein with growth hormone would thus control bleeding by the excess of B which would neutralize A. Dr Melgs in a recent paper found that in cases where antuitrin S had been used for menorrhagia or metrorrhagia there were a large number of ovarian cysts in operative cases. This is explainable when we take into consideration the fact that

antuitrin S is rich in A and thus used to stimulate an already overstimulated ovary. It can be readily seen that in these cases the growth hormone alone would have been preferable. Now since prostigmin (Upjohn) the active principle of corpus luteum, obtainable, this would be even more desirable.

I have one case to report if you will permit me. This is a case of a woman of 26 years (para 1) who apparently had a dilatation and curettage performed for menorrhagia at a nearby large hospital. Five days after discharge from the hospital she began to bleed profusely. I sent her into a hospital a week later for another dilatation and curettage suspecting the presence of polyps. At the operation none having been found I performed a trachelorrhaphy and colpoperineorrhaphy. She made an uneventful recovery, but the following period was attended by the same amount of profuse bleeding. A quantitative analysis at this time showed definite evidence of an endocrine disturbance to wit 30 rat units of female sex hormone per liter. A basal metabolism test showed a rate of 26 per cent minus. Treatment was begun with 2 cc of growth hormone, once a day for five days and thyroid gr 1, t.i.d., continuously. This treatment was repeated ten days before the expected menstruation and thereafter for three months until she became pregnant, and at each period prior thereto she had an excess flow but no menorrhagia. In spite of the recommendation by a reputable gynecologist whom she consulted without my knowledge that a hysterectomy be performed, I persisted in this treatment and later delivered her of a normal living child. Since that time she has been menstruating normally without the use of any hormone therapy.

DR. FREDERICK L. GOOD Boston In reply to a question from the floor in the case of the hypertensive patient what her endometrium shows now let me say I cannot tell you what her endometrium shows in so far as a pathological examination is concerned because the patient has yet to be operated. She is unmarried with a normal, conical cervix and uterus that is normal in size or smaller than normal and vaults that are free. I haven't forgotten the possibility of malignancy of the fundus in that case. In fact I have borne it in mind constantly. She is not losing weight however. On the contrary she has put on weight and the picture has never been such that I felt duty bound to do a diagnostic dilatation and curettage.

About the Elliot machine let me say that I am not going to discuss the relative merits or demerits of this apparatus in the treatment of cases of pelvic inflammation. I will say however that I do not like the Elliot machine in the treatment of menorrhagia or metrorrhagia. Dr Kickham rightfully reminds us of the frequency of malignancy and stresses the fact that where there is any suspicion a diagnostic dilatation and curettage should be performed. I agree with him in that opinion heartily.

Dr Boland raises the question of the value of radium or deep x ray therapy in cases of fibrosis and inquires in what type of case of fibrosis I would recommend radium and deep x ray therapy and in what type I would recommend surgery. If after doing a diagnostic dilatation and curettage I find a uterus that is but slightly deeper than normal, or that is regular in contour a uterus that is about the size of what we conceive a 6 to 8 weeks pregnancy to be if I had a uterus smaller than my closed fist (indicating) I would treat that case with deep x ray therapy and radium. If the uterus were larger than that I would waste no time with deep x ray therapy or radium but would do a hysterectomy. Dr Boland raises the question of the possibility of pelvic inflammation when the patient is

heim-Zondek or Friedman test is positive with greatly diluted urine (one tenth the usual amount) and that, if the pregnancy be of more than sixteen weeks' duration, roentgenologic examination will fail to show centers of fetal ossification. The passage of the little cysts which constitute hydatidiform mole is conclusive evidence.

The treatment of mole is immediate removal of the growth *per vaginam* possibly, but better by abdominal hysterotomy under local anesthesia, the mole being removed under vision. It is almost needless to say that all such cases should be closely watched, with periodic Friedman tests, to determine the possible signal of chorionepithelioma.

The other causes of bleeding during the first three months which I have mentioned are uncommon and may usually be recognized with ease by a speculum examination.

In the second trimester, abortions still take the lead as a cause of hemorrhage, closely followed as this period draws to a close, by the bleeding from placenta praevia. Ectopic pregnancy, polyps, and so forth may be responsible but not commonly so, since their presence has been usually disclosed earlier.

After the fifth month, placenta praevia must always be uppermost in the mind of the obstetrician, when uterine bleeding is present. Here the classic symptom is painless bleeding, often slight in amount at the first attack, with irregularly recurring hemorrhages of increasing severity. The diagnosis of placenta praevia so early in pregnancy offers great difficulty. Since endometritis is an etiologic factor, a history of preceding abortions or uterine disease is of some value. The condition occurs far more commonly in multiparas than in primiparas, and the bleeding is always painless, and seemingly without cause, although coitus or excessive muscular exercise may precipitate a hemorrhage.

When there is grave doubt, the roentgenologic method or diagnosis as described by Ude and Urner<sup>1</sup> is of great value. Their technic is to instill into the empty bladder about 40 cc of a solution of sodium iodide (12½ per cent) or other contrast material. An anteroposterior film of the pelvis is now made, the catheter having been first withdrawn. In normal pregnancy the presenting head lies almost in contact with the bladder, the intervening space occupied by the lower uterine segment, the space between bladder margin and fetal head appearing to be about 6 to 8 mm in length. In placenta praevia the mass of the placenta, its concave border upward, lies between the fetal head and the bladder, separating the two by a space of varying width depending upon the thickness and location of the placenta, and clearly visible on the x-ray film. This method constitutes a distinct advance in the diagnosis of placenta praevia

especially because it involves no vaginal manipulation which might favor separation or lead to infection.

Lacking roentgenologic facilities, the diagnosis must depend upon the history, the nature of the bleeding and auscultation with possible demonstration of a placental bruit low over the symphysis. The discovery, upon vaginal examination of a soft doughy mass lying between the head and the cervix will confirm the diagnosis, but this is a dangerous maneuver and should not be undertaken unless the accoucheur is prepared to deal at once with dangerous hemorrhage.

The treatment of placenta praevia constitutes one of the major problems of obstetrics and the management of this lesion before the complete viability of the child is a very perplexing one. It has been well said that there is no expectant treatment of placenta praevia, and one or two bitter experiences with attempts to temporize with such situations have amply confirmed me as to the correctness of this axiom. What is to be done with the young woman, a primipara let us say, who is in the seventh month of her pregnancy, ardently desires a child and develops the characteristic signs of placenta praevia? It is true that in many instances a tranquil life, avoidance of coitus, vigorous exercise and the use of cathartics, will allow pregnancy to continue to term or nearly so, without serious hemorrhage. It is also true that such patients may suffer a tremendous blood loss, of dangerous or even fatal volume at any moment, the bleeding sometimes occurring during sleep. Nor is there any procedure available by which such accident may be forecast.

It follows then that pregnancy should be terminated as soon as the diagnosis is made, either by abdominal hysterotomy, or by induction of labor, depending upon the degree to which the placental mass covers the cervical canal. On the other hand, the desire to conserve the life of the infant, religious objections, and the fact that pregnancy may continue without disturbance, render such radical treatment quite distasteful, so that I have come to the conclusion that the best plan available is to explain the situation to both parents in great detail and to require that the final decision come from them. For the protection of the physician against future criticism should disaster follow conservative management it is well to have the prospective mother and father state their wish in writing.

When the first hemorrhage occurs after the child is viable, a different problem arises. Undoubtedly, the best prognosis to mother and infant is offered by Caesarean section, preferably of the classical type, performed under local anesthesia by one fully trained in major obstetric surgery and in a qualified hospital. This



in uterine gestation. The amenorrhea is generally not complete, the patient stating that she has missed a period, but noted some slight spotting a week or two later, which has been repeated in greater amount before the onset of pain.

On bimanual examination, the uterus in abortion is definitely increased in size, is soft and globular in outline. The cervix is velvety and dilated to a varying extent. There may be some cyanosis of the cervical and vaginal mucosa and Hegar's sign, obliteration of the lower uterine segment, may be present. Ladin's sign, a small area of marked softening in the anterior wall of the cervix and lower uterine segment, is a common finding. In ectopic pregnancy, the uterus is generally only slightly enlarged and the characteristic boggy density is not noted. Movement of the cervix is often quite painful, and palpation of the adnexa may or may not reveal the presence of a tender, soft, spindle shaped mass. If there has been a considerable accumulation of blood in the pelvic cavity, the culdesac may bulge, with a doughy sensation being imparted to the examining finger.

The nature of the pain in the two conditions is often very valuable in diagnosis. In abortion the pain is intermittent, cramp-like, and the patient likens it either to menstrual cramps or labor pains. In ectopic pregnancy the pain is at first to one side or the other of the mid-line and then becomes a generalized abdominal ache, as free blood in the peritoneal cavity causes irritation and mechanical peritonitis.

The management of abortion with severe hemorrhage is usually restricted to firmly packing the vagina with gauze or cotton, under aseptic precautions, the packing to remain in place for twenty-four hours, after which the products of conception will often be found lying free in the vagina, upon the removal of the gauze. When the abortion occurs at the end of the third month, or early in the fourth, the placenta may often be found lying in the cervical canal and presenting as a tightly rolled cylinder. Simple extraction with the fingers or a ring forceps, under such condition, often stops the bleeding. The administration of ergot, especially the newer ergonovine preparations, will do much to contract the uterus, and aid the extrusion of the ovum.

Curettage is not often necessary, although it may be required in the presence of persistent bleeding. Although this is a minor operation it requires considerable skill and care, for perforation of the pregnant or puerperal uterus is by no means an uncommon accident. In a case recently admitted to Kensington Hospital for Women, an attempt at evacuation of the uterus resulted in the drawing, through a rent in the uterine wall, of four feet and two inches of

ileum, completely stripped from its mesentery (fig 1). On laparotomy, the loop of gut was found so tightly imprisoned in the uterine wall that practically no bleeding had taken place and simple resection of the bowel, and suture of the uterine wound, resulted in prompt recovery.

The management of ectopic pregnancy requires little comment. Prompt laparotomy upon the establishment of the diagnosis is the rule. One point of importance is that, in the interval



FIG 1. A loop of ileum stripped of its mesentery and drawn through a perforation of the uterus in an attempted evacuation for incomplete abortion. (Kensington Hospital for Women.)

between the occurrence of the hemorrhage and operation, there should be no stimulation or intravenous therapy practised. Morphine to secure rest, elevation of the foot of the bed, and external heat, are valuable measures, but stimulation should be reserved until the patient is prepared for section, when blood transfusion, 10 per cent glucose intravenously and cardiac stimulants may be used freely.

Hydatidiform mole is a somewhat uncommon, but very definite, source of uterine hemorrhage. The diagnosis may be confirmed by the fact that the uterus is considerably larger than normal for the duration of the pregnancy, that the patient has experienced more than the ordinary degree of nausea and vomiting, that the Asch



postpartum hemorrhage with retained placenta which demands extended discussion

# REFERENCE

Ude W H and Urner J A Roentgenologic diagnosis of placenta praevia Am J Obst. & Gynec. 29:1007 (May) 1935

(Lantern slides were shown by Dr Schumann illustrating some of the points presented in the paper read by him)

# DISCUSSION

CHAIRMAN KICKHAM I want to thank Dr Schumann for a most informative paper. He has certainly given us every fact in connection with antepartum hemorrhage and I am afraid the men who are going to open the discussion will find difficulty in deciding what to discuss. The only advantage in this is that the man to open the discussion is so competent that I think he probably will find something that will interest us that Dr Schumann may have missed.

Before doing that I am going to ask members of the Committee—it is part of the duty of the Chairman to appoint a Committee to bring in the names of the officers for the next year—the Nominating Committee to get together now or at any time they wish so that they will have these names for us at the end of the meeting. The Nominating Committee has been appointed—Dr Boland, Dr Almy and Dr D'Errico. The discussion will be formally opened by Dr Louis E Phaneuf, Boston.

DR. LOUIS E PHANEUF Boston I have listened with great interest to Dr Schumann's excellent presentation. Hemorrhage during pregnancy labor and the puerperium may always be discussed with profit before a Society like ours. The essayist has limited his remarks to antepartum hemorrhage, a subject which in itself is a vast one. The diagnosis and management of abortion, ectopic gestation and hydatidiform mole have been so well covered that there is but little to add. Two points which Dr Schumann has brought out should be emphasized first, the great importance of blood transfusion as a life-saving measure in all cases requiring it and secondly prompt laparotomy when the diagnosis of extrauterine pregnancy is established. His suggestion of the treatment of hydatidiform mole by abdominal hysterotomy, under control of the eye is a valuable contribution in the management of this disorder. By this means we are more likely to remove the entire mole without trauma to the uterine musculature thereby lessening the chances of a future chorionepithelioma. While in the past hydatidiform mole was not infrequently treated by hysterectomy in order to avoid the development of this highly malignant neoplasm of the chorion the Aschheim Zondek and the Friedman tests have made it possible to observe the patients treated for a mole closely and as a result of this it has been possible safely to conserve the uterus in a number of instances.

Placenta praevia is an important source of hemorrhage during gestation. In a hospital service where facilities are at hand for roentgen diagnosis the method advocated by Ude and Urner and described by Dr Schumann should be employed more frequently thus obviating the danger of starting a copious hemorrhage consecutive to a pelvic examination. The dangers inherent in the conservative treatment of this condition have been brought out. Cesarean section doubtless offers the best chances for mother and child. This method of therapy has been gaining ground steadily during the last quar-

ter of a century. The type of cesarean section to be chosen depends largely upon the individual preference of the operator, some preferring the classical type of operation, while others elect to operate through the lower segment in order to inspect the placental bed and suture any bleeding areas encountered. One procedure in the conservative treatment of placenta praevia in the presence of a dead fetus has recently been mentioned by Dr Fred L Adair. When there is bleeding from a placenta praevia and the fetus is dead a large vulsellum may be attached to the fetal scalp by applying traction on the forceps the fetal head will cause pressure against the placenta and control hemorrhage. This maneuver which is easier to perform than the Braxton Hicks version, obviously, is not applicable to the living fetus.

Abruptio placentae is one of the most severe complications of pregnancy. Toxemia of pregnancy and trauma, such as blows on the abdomen, both play a rôle in the etiology. As Dr Schumann has said, both maternal and fetal mortality are exceedingly high.

While in the lesser degrees of separation, delivery through the birth canal if there is sufficient cervical dilatation is the method of choice, those women who have a complete separation resulting in the so called Couvelaire uterus are in my opinion, treated with greater safety by abdominal celiotomy. If one has in mind the histologic picture of the uterus in the presence of this condition one must admit that it takes a great deal of courage to stand by and await developments. I have repeatedly observed that in uteroplacental apoplexy with the uterine musculature friable, bleeding and echymotic, the lower uterine segment usually escapes the pathologic process. Advantage may be taken of this in performing cesarean section since by placing the incision in the lower pole of the uterus, this organ may be saved while it would, in many instances be sacrificed if the incision were placed in the friable disassociated musculature of the uterine corpus because of uncontrollable hemorrhage.

I want to express my appreciation to Dr Schumann for this timely paper which so well covers the subject of the hemorrhage of pregnancy.

CHAIRMAN KICKHAM Unfortunately Dr Kellogg has been unable to attend but he sends us Dr M V Kappius to take his place and second the discussion.

DR. M V KAPPIUS Boston Dr Kellogg regrets his inability to be here in person but he has prepared his remarks in written form and I am presenting them, of course as his.

Dr Schumann is one of America's great teachers in obstetrics and we are indeed fortunate to have him present a paper at this Section meeting.

The usual pointed brevity and completeness of his paper make comment on it of little added value. I shall confine my discussion to supplementing what he has said about Premature Separation of the Normally Implanted Placenta based on our experience with this condition at the Boston Lying in Hospital and on my own personal experience.

The points I would make may be briefly stated as follows:

(1) That premature separation is frequently and fortunately *not exactly* abrupt in its course—but slowly progressive in a matter of minutes to hours so that the classical picture of ligneous uterus and so forth which he presents represents the end of a process which though truly sometimes abrupt frequently—if the patient be placed under immediate observation—is slow enough to permit the extraction of a live baby by abdominal section. This we all know. I merely stress the point because it has

applies to all cases, except those occurring in multiparas with partial placenta praevia, where there is an available area of the cervical canal occupied by the membranes alone, thus permitting the induction of labor by simple rupture of the membranes or by the insertion of a dilating bag. As my own experience grows, I find myself rarely regretting the decision to deliver by section, while sometimes wishing this method had been chosen rather than the finally selected vaginal route.

In those emergency cases wherein the obstetrician is faced by the problem of serious hemorrhage with beginning labor, in a locality where prompt and efficient section is not available, the matter is serious indeed. Here there are several procedures available, none of them quite satisfactory but necessary as emergency measures. They are as follows: simple rupture of the membranes with the use of small doses of pituitrin, subcutaneously or by the nasal route, Braxton-Hicks version, the use of the metreu-rynter or dilating bag, and, as a last resort, vaginal packing together with a tight abdominal binder.

Simple rupture of the membranes, the Rotunda method, sometimes permits the descent of the head to act as a tampon, and, when combined with pituitrin to maintain uterine contraction, is of much value.

The Braxton-Hicks version, turning the child and drawing down a leg until the buttocks make pressure upon the placenta, works well for the mother but is extremely hazardous for the child, and is not available unless there be sufficient cervical dilatation to permit the entrance of two fingers into the uterine cavity. It should be remembered that extraction of the infant after this type of version is dangerous and that delivery should be left to the forces of nature so far as possible.

The use of the dilating bag was strongly advised by the late Dr. Cragin, who achieved great success with this treatment. The folded and lubricated bag should be passed alongside of the placenta if this be possible, or should be plunged through the mass of that organ if the praevia is central. The violent hemorrhage excited by perforation of the placenta is dealt with by rapidly filling the bag to capacity with an antiseptic solution and attaching a weight to the tube to insure strong pressure against the placenta from above.

Vaginal packing is a last resort, as has been said. If hospital facilities are not available, if the cervix is elongated and undilated and the hemorrhage furious, it is proper to pack the vagina fully and firmly using due precautions as to asepsis, and then to apply a very tight abdominal binder. This plan may serve to compress the placental site between the packing be-

low and the uterus which has been forced down from above, and is a device which, while not generally advised, may be life saving if no better plan of treatment offers.

In the last trimester, placenta praevia and abruptio placentae are the chief causes of uterine bleeding. Abruptio placentae, premature separation of the normally implanted placenta, is a somewhat uncommon accident which may rarely arise as a result of trauma, more frequently is said to be due to some form of toxemia, but often occurs without demonstrable evidences of such toxemia or even of degenerative changes in the placenta itself.

This accident, the concealed hemorrhage of the older writers, usually occurs during the last month of pregnancy, sometimes earlier. It is characterized by hemorrhage, not necessarily great in visible amount, but always associated with pain, more or less severe in type.

The separation usually takes place suddenly, the woman experiencing a sharp, lower abdominal pain, which steadily increases. The uterus becomes hard, often described as ligneous, and is tender to palpation, the fundus becoming flatter and broader. Fetal movements and heart sounds disappear and a trickle of blood escapes between the membranes and the uterine wall and appears at the vulva.

If the separation is extensive, the evidences of internal hemorrhage develop rapidly, the air hunger, leaking skin, pallor and falling blood pressure attesting to the profound anemia. As the separation becomes more nearly complete, the presence of blood in the uterus may force a large vaginal bleeding with many clots. Abruptio placentae is a matter of grave moment, both maternal and fetal mortality being exceedingly high.

The only available treatment is immediate delivery, *per vaginam*, if happily the cervix is sufficiently dilated to permit of forceps extraction, or abdominal hysterotomy. In the latter case, the uterus is often so infiltrated with blood, that hysterectomy becomes necessary.

Blood transfusion has not been mentioned hitherto in the treatment of the hemorrhage of pregnancy in order to avoid repetition in the discussion. Modern obstetrics demands that, in every case of uterine bleeding, the prompt securing of blood donors, and their proper typing and matching with the patient is a *sine qua non*, and transfusion should be resorted to early, and repeated as often as the condition of the patient demands.

Although, strictly speaking, pregnancy continues until the end of the third stage of labor, this paper has been arbitrarily limited to some of the earlier phases, and I have refrained from saying anything about the blood loss attending intrapartum rupture of the uterus and

but better by abdominal hysterotomy, under local anesthesia. It is almost needless to say that all such cases should be closely watched, with periodic Friedman tests to determine the possible signal of chorionepithelioma.

With regard to Dr Boland's question, our reason for using only 40 cc is so as not to distend the bladder and so obscure the shadow of the placenta. The average female bladder contains about 140 cc to distention.

With regard to the gentleman's question as to the duration of pregnancy, I do not know. I haven't had any opportunity to examine these patients before the end of the seventh month by this method and I am almost certain that in a pregnancy earlier than during the sixth or seventh month the test

would be of little value because the head is so high anyway. But since cases which are of the severe bleeding type usually occur somewhere between the seventh month and term all that have come under our observation have been at this time.

I beg to thank the Society and Fellows for the reception of my paper.

CHAIRMAN KICKHAM: I feel more indebted than ever to Dr Schumann, because as I said in the opening remarks he is not only a great surgeon but a perfect gentleman and a good fellow thrown in.

The third paper is on 'Hospital Puerperal Sepsis.' There is no subject that is more important than sepsis. We have the good fortune of having a gentleman talk to us who had the handling of one of those awful epidemics. Dr George M Shipton.

## HOSPITAL PUERPERAL SEPSIS\*

BY GEORGE M SHIPTON, M D †

### *Mr. Chairman and Members of the Section*

WITHIN the past few months we have had the opportunity of seeing, in a really worthwhile moving picture the life of Louis Pasteur. This dramatization was the source of comfort to the women of today in the thought that they are not living in an era of "Child Bed Fever" and physicians antagonistic to scientific progress. But for those of us actually engaged in the practice of obstetrics the reflections stimulated by this thrilling narrative are not so happy.

For, although we first learned when we were students the story of Pasteur and his great contribution to our specialty and although as interns and later as physicians we have never passed a year without hearing or reading a paper on obstetrical asepsis the fact remains that we still have outbreaks of this dread disease.

Therefore, with no idea of bringing to you any facts that have not been known for years but rather, with the hope that by repetition and frank discussion we may all become constantly aware of this danger I wish to present the experience through which we passed in a general hospital a year ago.

The unfortunate part of these stories about outbreaks of disease is that they happen to the other fellow and our attitude is too often one of sympathy for him and self congratulation over the fact that we personally have not been affected. Not until disaster actually strikes home do we consider the lessons to which we have listened for years without actually learning anything. Many of us can remember the difficulties encountered in enforcing in our general hospitals, the practice of wearing sterile gloves for obstetric examinations and deliveries. For

the purpose of emphasizing the many angles of puerperal infection in a general hospital may I present our story as it was developed.

On the morning of February 16, 1935 I was asked by one of our interns to see a private patient whom he had delivered in the absence of her physician six days before. She was a para II with a story of two days' illness with chills before admission. She had been delivered spontaneously one hour after admission. That same evening her temperature was 103° and had swung up and down with chills until I saw her on her sixth day with 101°, a rigid abdomen, and a septic rash. A blood culture taken remained negative but a urine culture showed non-hemolytic streptococcus. She died the next day.

While studying her chart I remarked that it looked like a streptococcus infection and that we certainly did not want that to get loose in the maternity wing. The floor supervisor assured me that the patient was completely isolated but, since I was interested in the possibility of any infection, would I please look at some other charts. Whereupon she produced the records of five patients all in charge of different physicians and all running high temperatures. Although, at the time I had several patients on the floor and had made rounds at least twice a day, this was my first knowledge of the condition. A quick check-up among the men involved revealed the fact that each one was ignorant of any of the other sick cases. In other words, although there had been six very ill patients on a floor the normal load of which is twenty women, the entire picture was known to the nurses only. Ridiculous as this sounds it is a situation possible in any general hospital having a large courtesy staff, each member of which feels that he must work out his own problems.

On February 20, we sought the advice of Dr Goethals of Boston who happened to be in the neighborhood. While he did not feel, from a study of the charts, that there was any evidence of a hospital infection he did suggest a change

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†Shipton, George M.—Obstetrician, House of Mercy Hospital, Pittsfield, Mass. For record and address of author see "This Week's Issue" page 515.

always seemed to me that to emphasize the complete picture of abruptio is, from a teaching point of view, to underemphasize the importance of early diagnosis for both baby and mother. In our experience external bleeding is almost always—though not inevitably—the cardinal symptom, and internal concealed hemorrhage alone, *per contra*, the rarest exception.

(2) *Treatment* At the Lying In Hospital the maternal mortality in this condition treated by abdominal cesarean section in an early series was 22 per cent and in a longer later series including the first, 15 per cent. Because of this it seemed wise to Dr Irving to eliminate cesarean section when ever possible. With this object in view the following policy is now pursued there. Cases seen when fully dilated are delivered from below. Those in which the fetal heart is good and the baby of reasonable size and sufficient number of weeks gestation and the cervix not fully dilated are delivered by abdominal cesarean section. Cases in which the baby is dead too premature or in obviously bad condition are treated by tight pack and Spanish windlass. The series so treated is not long enough yet to draw just comparative conclusions. However, one patient only in this series has died, and I believe from the results to date that this method decidedly deserves further trial by us and a broader use in this class of cases throughout the country. This in spite of the fact that it made no appeal to me at all when first proposed.

(3) *The Question of Hysterectomy in Premature Separation* It has been for a long time my personal belief that hysterectomy is rarely called for in these cases. So-called disintegration of the muscle fibers of the uterus *per se* is rarely, if ever, I think an indication for this. Only cases that bleed under somewhat prolonged observation with the abdomen open merit hysterectomy. These are rare and in the hospital series have given our worst mortality even with hysterectomy. I have yet to take out a uterus in this condition except in one instance hardly to the point. This patient had a separated placenta diffusely adherent placenta and fibroids. One patient in my personal series died. The autopsy showed that she died with acute hepatitis without hemorrhage from the uterus or necrosis of the uterus though it was badly disintegrated. Rapid restoration of the integrity of the uterus in spite of primary bleeding—often from each stitch hole—and watching with the abdomen open have always permitted me to leave the uterus with some misgivings. I am sure, however, that some day I will have to remove a uterus for bleeding.

(4) The question of anuric deaths in these patients we have elsewhere emphasized. I mention it here only to state the belief that it should never be overlooked as a possibility and that steps should be taken to combat it from the beginning. These steps differ in different cases. Nice judgment must be exercised as to transfusion and fluids depending on blood pressure, edema, immediate kidney function and probable cardiac function.

Dr. D'ERRICO, Boston In reference to the differential diagnosis between extrauterine pregnancy and other pelvic disorders I wish to call your attention to a simple test which I have found very helpful in the last five years in more than twenty cases of ectopic gestation with intraperitoneal hemorrhage. It is certainly a very much more reliable and constant sign than the famous Cullen sign that all of us have read or heard described but most of us have never seen.

For lack of a better name I call it the 'bed shaking sign' or test, or, as my house officers call it the 'D'Errico sign'. It consists in gently rocking the

bedspring on which the patient lies. In presence of intraperitoneal hemorrhage from any cause including intraperitoneal bleeding from ruptured pelvic varicosities, ruptured uterus ruptured hemorrhagic cysts ruptured ectopic gestation and ruptured viscus due to trauma, the abdominal pain is greatly increased.

This 'bed shaking sign' is negative, that is, pain is neither elicited nor increased if the bedspring is gently shaken, in threatened abortions and miscarriages, pelvic inflammatory disease, appendicitis general or local peritonitis, gallbladder disease urinary tract disturbances and so forth.

What the explanation of this phenomenon might be I do not know, nor will I venture a theory to explain it. But I wish to offer it as a simple aid in the diagnosis of ectopic gestation with intraperitoneal hemorrhage.

Dr. BOLAND, Boston I wish to express my appreciation to Dr. Schumann for his excellent presentation of this subject. I was particularly interested in his lantern slides and would like to ask two questions. First, although his slides appear to have a heavier percentage I assume that he used a 5 per cent sodium iodide solution which is the customary percentage in cystogram work.

Dr. SCHUMANN, Philadelphia I did.

Dr. BOLAND, Boston Secondly when the bladder for cystogram injection normally takes 12 to 20 ounces, why does Dr. Schumann confine his injection to only 40 cc?

Dr. BENJAMIN PARVEY, Boston I would like to ask Dr. Schumann whether he believes that an Aschheim Zondek test should be done in cases of hydatidiform mole as a basis for deciding whether a hysterectomy or a simple dilatation and curettage should be done.

The rationale for this rests with the fact that in cases of metastasis the test would be persistently strongly positive whereas, a negative test would indicate no metastasis. Would Dr. Schumann recommend this procedure to obviate the necessity of a total hysterectomy? I have two cases of hydatidiform mole in mind where no radical measures were taken and in which there have been subsequent pregnancies. In one instance prior to the development of the Aschheim Zondek test, the patient spontaneously passed a basinful of small chorion cysts after having been in bed for a period of three months in order to preserve what I assumed to be a normal pregnancy. Since that time she had four normal deliveries. In this case hysterectomy was strongly advised. In another case of recent date I emptied the uterus of a patient for a hydatidiform mole, following this I carried out weekly Aschheim Zondek tests which continued to be positive for three weeks at the end of which time three consecutive tests were negative. Four months later this patient became pregnant and since then has been delivered of a normal child. I feel that we can safely rely on the Aschheim Zondek test to determine the presence of metastasis and in this way not deprive a patient of the possibility of future offspring.

Dr. F. A. L'ESPERANCE, Northampton Will the length of pregnancy make any difference in your findings as regards the number of cubic centimeters from the level of the sodium iodide in the bladder to the placenta?

Dr. SCHUMANN, Mr. Chairman—With regard to Dr. Parvey's statement I did not say anything about hysterectomy. The treatment of mole is immediate removal of the growth through the vagina possibly,

timized No visitor was permitted to call on a patient in the old wing and then go over to the clean department Physicians making calls had to visit the old wing the last thing before leaving the hospital

Although the Health Department figures showed scarlet fever enduring for the next two months and the general practitioners reported the persistence of other streptococcal conditions in the community, no sick cases developed in the new wing and we were able to move back to a renovated old wing in a month

The experience has given us several aids in the control of puerperal sepsis

1 A great deal can be accomplished by educating the public to the relation between community illnesses and maternal infections

2 The organisms are carried in the nose and throat and masking at all times that the perineum is exposed is absolutely necessary

3 Suspicious or sick patients should be admitted to isolation

4 Visitors to obstetrical wards must be limited

5 There must at all times be frank discussion and cooperation among all men using a maternity department and the hospital management

None of these ideas are new, I have had no idea of teaching anything

My sole purpose in this presentation is to emphasize by repetition that which we have all heard but which seems unimportant until after we have been in trouble

I am deeply indebted to the hospital management for the use of their correspondence, and laboratory data, and to the attending physicians for permission to study their case histories

As a public health measure I should like to lay before you for discussion, the advisability of requiring that all streptococcus conditions be made reportable

#### DISCUSSION

CHAIRMAN KICKHAM Dr Shipton has given us a delightful paper and one that is very important Before opening the discussion it is customary at this time to ask the Nominating Committee for a report

DR. BOLAND After due deliberation Dr Almy Dr D Errico and I have decided to elevate our able Secretary who has performed so well this year to the office of Chairman of the Section and to appoint Dr Roy J Heffernan of Boston as Secretary

CHAIRMAN KICKHAM Dr Raymond S Titus has been nominated Chairman and Dr Roy J Heffernan Secretary All those in favor say aye those opposed no It is voted.

Dr John C Fisher of Boston will please open the discussion of Dr Shipton's paper

DR JOHN C FISHER Boston Mr Chairman and Members of the Section—

I doubt if there is any maternity hospital having cared for patients over a period of years that has not had an experience similar to that Dr Shipton has just related His paper deals with the epidemic phase of the problem.

Sepsis a Greek word meaning putrefaction, in our language means the introduction of putrescent material or bacteria into the blood stream It therefore includes generically all forms of septicemia, as well as infections local or general The puerperium begins with labor and ends when involution of the uterus is complete Puerperal infection (infection meaning to put into or stain) is a pro-genic bacterial invasion incidental to this period, the portals of entry being wounds in the perineum vagina and cervix, the placental site and cracks in the nipples It may be sporadic or epidemic Epidemic puerperal infection in hospital practice would be I think, a more fitting title to Dr Shipton's paper

Local infections do not ordinarily cause death except through embolism following thrombophlebitis or by becoming generalized Seventy per cent of generalized puerperal infections or septicemias, according to statistics obtained from the Massachusetts Memorial Hospitals are fatal These data were obtained from a series of 41 cases occurring at the hospital between 1924 and 1936 While positive blood cultures were not obtained in all cases nevertheless their clinical course presented a picture of septicemia The absence of positive blood cultures in many of these cases is probably because the invading organism was of the anerobic type showing no growth on exposure to air In cases with positive blood cultures the hemolytic streptococcus was found most often The colon bacillus when found was associated with the hemolytic streptococcus Only one case showing a positive blood culture of *Streptococcus viridans* recovered

The death rate from puerperal sepsis in the United States is about 25/100 of 1 per cent or 40 per cent of the total maternal mortality about 20 per cent of all maternal deaths are chargeable to criminal abortion. The morbidity rate is conservatively about 15 per cent

The incidence of puerperal septicemia at the Massachusetts Memorial Hospitals in 16 752 deliveries from 1924 to 1936 was 24/100 of 1 per cent, or a mortality rate of 17/100 of 1 per cent.

The majority of cases occurred during the winter or early springtime bearing out Dr Shipton's observations that with acute upper respiratory infections there is a definite relationship About 20 per cent of individuals harbor streptococci in their throats Streptococci may be present in the vaginas of pregnant women but apparently according to studies made by Ronald Hale (*J Path & Bact* [Nov] 1935) only a particular strain of *Streptococcus hemolyticus* is chiefly responsible for puerperal septicemia. This strain is not found under normal conditions in the vagina before or after delivery Seven per cent of normal individuals are nose or throat carriers of this strain. From this it would appear that *Streptococcus hemolyticus* infection is not endogenous except possibly through entrance into the blood stream from the patient's own respiratory tract that is the organism is almost or always introduced from without In view of this I fail to see the practical value of reporting all streptococcal conditions to the health department I believe far more might be accomplished through instruction of the expectant mother by her physician

The majority of sporadic cases in this series already referred to were subjected to some form of operative manipulation or suffered from anemia toxic or otherwise which evidently caused a general

in our technic, namely, the wearing of masks over mouth and nose by both physicians and nurses at all times that the perineum was exposed for any purpose whatever. Like a great many general hospitals, we had been masking for deliveries and operations only. On the advice of several members of the active staff, the hospital management declined to adopt this suggestion for fear of terrorizing well patients.

Two days later another case was delivered and promptly began to run a high temperature. She was discharged on her thirty-first day to convalesce at home with a diagnosis of pyelitis, cystitis, and septicemia.

Laboratory work on the sick cases showed streptococcus or hemolytic staphylococcus in the blood, or urine or both. March 2, a para II was delivered one hour after admission. Twenty-four hours later, her temperature was 101°, the next day it was 105°, on her ninth day a posterior colpotomy produced a pint of pus. She died on her twelfth day. Urine culture showed hemolytic streptococcus.

Not only the hospital staff, but the general public became aroused. Rumor credited the hospital with at least one maternal death a day with totals running as high as twenty-five to date.

March 13 a primipara was delivered who was apparently well in every way, with her, during labor and at delivery, was a relative who had been associated with the fatal streptococcus emergency case admitted 4 weeks before. On the third day this patient began to have chills, on her eleventh day she died of septicemia.

An investigation by two epidemiologists from the State Department of Health brought the information that the entire difficulty was a matter of coincidence and nothing could be done about it. Several days later they telephoned the order for masking at all times. This was just four weeks after Dr. Goethals had made the same suggestion and it was turned down.

During the months of February and March there were sixty-eight deliveries with sixteen, or 23.5 per cent sick patients and four, or 5.9 per cent dead.

Of the four cases dying, one had nonhemolytic streptococcus in the urine with negative blood culture, one had hemolytic streptococcus in the blood and a negative urine, one had hemolytic staphylococcus in the urine and no blood culture, and one had pus in catheterized urine but no urine or blood culture.

Of the other 12 nonfatal cases, 5 showed B. Coli and 2 showed a mixture of staphylococcus and streptococcus in the urine. There were no positive blood cultures in this group.

Upon questioning the men doing general practice it was learned that there were a very unusual number of streptococcus conditions in the

community, namely, streptococcus throat, erysipelas, and scarlet fever. Unfortunately only the last is reportable to the Health Department, and therefore accurate numbers can be given only on the scarlet fever cases, of which there were fifty during this period.

Correspondence showed the same condition throughout the East. In other words we were being besieged by a vast army of streptococci. So great was the surrounding peril that one prominent Boston surgeon declined to operate except on emergency cases for two months, postponing 153 private cases, but deliveries can not be postponed and the situation had to be met.

Nose and throat cultures were done on the 15 physicians involved, and the entire staff of 11 obstetrical nurses. Of the 15 nose cultures all 15 physicians showed hemolytic staphylococcus, of the 15 throat cultures 9 showed hemolytic streptococcus, 2 nonhemolytic streptococcus and 2 hemolytic staphylococcus in the nose and hemolytic streptococcus in the throat. These were the identical organisms recovered from the fatal cases and bore out the fact that the community was infected.

Fortunately there was a new and so far unused wing of the hospital and we decided to make all of our changes at once. On March 20, we opened the new wing, carrying over only instruments which could be sterilized by boiling and otherwise using entirely new equipment. A completely new crew of nurses was installed.

Through the cooperation of the local paper attention was called to the prevalence of streptococci in the community and the public was urged to protect expectant mothers by separating them from contact with any possible source of infection. This produced remarkable results in that patients immediately began reporting such contacts and asking advice. One patient who was booked for a cesarean in two weeks, called to say that she was caring for a mother who had erysipelas. The mother was immediately transferred to the contagious hospital, the patient was operated upon at term, and both mother and child are living today.

No patient was admitted to the maternity wing without a clean bill of health. At 2 o'clock one morning a private patient presented herself and the admitting nurse noticed a running nose and red eyes. The patient insisted that it was the result of labor pains. The hospital superintendent was called from her bed to give a decision. She agreed with the nurse, and in spite of an argument that awakened several patients, the woman was put in isolation and delivered there. Twenty-four hours later the patient presented a typical case of measles.

Masking was absolutely enforced, and visitors were limited and those few were closely scru-

know to be dangerous to the puerperal patient. We may succeed in protecting the patient from ourselves and those who are associated with us in their care but we cannot protect her from the laity with whom she must come in contact. It may be helpful to advise our patients as part of our prenatal care to keep out of crowds such as are encountered in stores and motion picture houses but it will not solve the problem, which, as Dr Shipton and Dr Fisher have indicated, is a very grave one.

Puerperal sepsis takes a high toll annually. The fifteen state study over a three-year period made by the Children's Bureau shows that 40 per cent of the deaths in this country from puerperal causes are due to puerperal infection. We are unwilling to assume the responsibility of the high death rate incidental to abortions of all sorts but we recognize that the prevention of this death rate is our solemn duty and we have pledged ourselves to keep it as low as is humanly possible.

At the Memorial Hospital, Worcester, we have had no epidemics of puerperal sepsis in the more than 25 years of existence of the maternity department. In fact, in reviewing the records for the past 25 years I was able to find only three cases of puerperal sepsis occurring in patients actually delivered in the maternity department.

DR ARTHUR T. HERTIG, Assistant Pathologist of the Boston Lying in Hospital. It is with the idea of reporting a somewhat unusual, small outbreak of puerperal sepsis in the Boston Lying in Hospital that I am taking the liberty of adding to the discussion of Dr Shipton's excellent paper.

There were two unusual factors in this small epidemic worthy of comment: one the clinical course of the first patient from whom the other two patients undoubtedly contracted the disease and the other the means by which these patients were infected.

The first patient was a multipara who entered the hospital for the treatment of her toxemia. Induction of labor was attempted by artificial rupture of the membranes. Two days elapsed before the patient delivered following a three-hour labor. Just prior to delivery her temperature was 101.5° but it fell to normal 12 hours later, only to rise to 102° by the end of the first postpartum day. During this day she was in a small three-bed Well Ward on the second floor. Because of the rise in temperature and pus and bacteria in the urine and costovertebral tenderness, a diagnosis of pyelitis was made and the patient was isolated in the septic division on the top floor of the hospital. A diagnosis of questionable sapremia was also made. During the next two days, the patient's temperature gradually fell to nearly normal and accordingly she was transferred back to the original three-bed ward on the second floor. However blood and vaginal cultures were taken just before transfer. Two days later on the fifth postpartum day (after she had been on the Well Ward for two days with her temperature returning to normal and without showing clinical symptoms or signs of puerperal sepsis) it was found that the vaginal culture showed practically a pure growth of *Streptococcus hemolyticus* while the blood culture was negative. Because of this objective bacteriologic finding she was readmitted to the septic isolation ward where she remained for thirty-three days, finally to be discharged fever free to the care of her private physician. Because of her mild course the clinical diagnosis of streptococcal puerperal sepsis was accepted with some reluctance. Final objective proof of the septic nature of the patient's disease was found during the microscopic examination of the placenta. Streptococci within leucocytes were demonstrated in the decidua and blood clot upon the mater-

nal surface of the placenta. It is evident, therefore, that this patient must have been discharging countless numbers of hemolytic streptococci from the time of delivery while suffering from what was apparently a bona fide pyelitis. Furthermore for three of the first five postpartum days she was among well postpartum patients and was subject only to the routine care given such patients. This fact was later shown to be a factor in the infection of the two fatal cases to be mentioned briefly.

Five hours after the first patient was delivered another multipara was normally delivered following a 2½ hour labor, by another operator and in a different delivery room. There may or may not have been some of the same nursing personnel assisting at both deliveries. At any rate the second patient was placed next to the first patient in the small three-bed ward on the second floor. At the end of the third postpartum day the second patient showed a sudden elevation of temperature to 102° with other signs and symptoms of puerperal sepsis. She was immediately isolated in the septic ward where she died of septicemia and generalized peritonitis due to the *Streptococcus hemolyticus* on her eighteenth postpartum day.

The day after the first patient was transferred to the septic ward for the second and final time (the fifth postpartum day for that patient) a normally delivered primipara was admitted to the large sixteen-bed ward next to the original three-bed ward both wards having the same nursing personnel. This third patient at the end of her fourth postpartum day suddenly had a chill with elevation of temperature up to 101.5° at which time a diagnosis of puerperal sepsis was made and the patient transferred to the septic ward. She ran a rapidly fatal course with psychotic manifestations and died on her tenth postpartum day of hemolytic streptococcal endometritis and generalized peritonitis.

An epidemiologic survey of these three cases was immediately undertaken upon the appearance of the third case. It was found that all patients had been on the same ward or in the same nursing unit and that the use of perineal ice bags by the first and third patients was the etiologic factor in transmitting the disease to the third patient. It is less clear just how the second patient contracted the disease although it must be remembered that these ice bags were changed every four hours and were handled as apparently noncontaminated objects that is they were carried by the nurses under their arms while collecting and distributing them (This was actually observed by the investigators). In addition, the ice bags were not sterilized after being used but were merely washed off, filled and covered with a single layer of clean gauze. Inasmuch as the ice bags by their nature and use were constantly cold and moist they offered excellent opportunity for the continued existence of the streptococci. Hence there are any number of possible ways in which the second patient (next to the first unrecognized septic patient) might have been unknowingly infected since the extremely infectious nature of the lochial discharge of the first patient was neither appreciated nor guarded against.

Regardless of the exact means by which streptococci were transferred from the first to the second patient it was evident epidemiologically that all three cases were related. Practical proof of this was shown by the cessation of the epidemic when the use of perineal ice bags was discontinued. Incidentally, throat cultures of the operating and nursing personnel involved were negative for hemolytic streptococci.

In conclusion it may be said that the only reason for reporting this outbreak of puerperal sepsis



lowering of resistance, while the epidemic groups included patients who had normal deliveries. I am of the opinion that some of the sporadic cases are due to endogenous infection and I am convinced that the majority of cases are infected directly by attendants (physicians and nurses) or indirectly through nursing utensils.

A few years ago I observed an unusual number of cases of acute mastitis in the wards of our maternity department occupying one floor of the building while on the floor below there were none. I thought at the time that possibly a difference in method of breast care was responsible for the contrast, but as I look back now I am of the opinion that some pyogenic organism having acquired a predilection for the lacerating breast was freely carried from one cracked nipple to another by the undergraduate nursing personnel.

There has been no epidemic outbreak in our hospital for the past eight years and I believe that discontinuing the use in the delivery room of the Kelly pad, the wearing of gloves in scrubbing and preparing the patient for delivery, masking in the delivery room, constant watching by the resident for evidence of skin and respiratory infections among the nurses and prompt isolation of infected patients have been largely responsible for this absence of infection.

On the employment therefore of strict asepsis in the delivery rooms, a reduction in the incidence of early operative interference, good operative technique when interference is necessary, the prevention of anemia, efficient nursing and instruction of the expectant mother in prophylaxis, may we hope in the future to lessen the incidence of puerperal infection in hospital practice.

DR JOSEPH W. O'CONNOR, Worcester: *Mr. Chairman and members of the section:* When the Chairman asked me to participate in the discussion of Dr. Shipton's paper I accepted with mingled emotions of pleasure and apprehension, pleasure, because I knew it would be a pleasure to discuss a paper that Dr. Shipton in his usual thorough manner would prepare and apprehension lest Dr. Fisher, Dr. Shipton and I be branded as rugged New England individualists whose opinions are not always acceptable to those who have to listen to them.

As I heard Dr. Shipton read his paper today, I was impressed with the courage it takes for a man to make a report on such an epidemic as occurred under his observation. At the meeting of the Section of Obstetrics at Cleveland in 1934, while discussing the paper of Dr. B. P. Watson of the Sloane Maternity Hospital of New York, Dr. DeLee made the statement that, of authentic reports of 29 epidemics of puerperal sepsis in hospitals which he had collected,

only one hospital had the nerve, the scientific love for verity to report the epidemic and that hospital was Dr. Watson's.

In 25 years of active obstetrical practice I recall reports on epidemics as being very rare occurrences in obstetric literature. A few months ago some of us here present heard the fine report made by Dr. John T. Williams on Puerperal Sepsis at the Boston City Hospital. Dr. Shipton's paper marks a milestone in the annals of this Section because it brings us as a group before a jury of our peers for a review of our aseptic policy in the conduct of our obstetric practice, whether we be specialists or general practitioners who still do obstetrics.

Of the striking features which Dr. Shipton has so graphically described, first is the high incidence of sepsis during two months of the year and secondly the frequency with which certain types of organisms were found in the upper respiratory

passages of those who were in attendance on these cases. We need not chide ourselves for harboring such organisms for it is my opinion that at certain times of the year none of us escape the possibility of being a potential source of infection or death to the patient who at the moment has the misfortune to be under our care, but we should realize that because of that inescapable condition we have the added responsibility of taking special precautions to protect our patients from the organisms which we innocently harbor.

During the winter months it is very obvious that the upper respiratory tract of the human being is the habitat of especially virulent organisms. Those who have made studies on carriers have given us rather interesting figures. Davis in 1921 demonstrated that the hemolytic streptococcus was present in the nose or throat of 45 per cent of apparently healthy individuals. He and Pilot two years before had demonstrated that it was present in the tonsillar crypts of 100 per cent of the cases studied. Hare in 1934 showed that virulent streptococci may be obtained from noses and throats of individuals with respiratory infection even when symptoms are slight or even absent.

It seems obvious from this paper as well as from previous reports that the most commonly found potential pathogens are various types of the streptococcus and staphylococcus which at certain times of the year may be regarded as almost universal in habitants of the respiratory tract of the physician, nurse and patient.

When hearing reports and papers dealing with hospital puerperal sepsis, one is impressed with the fact that no one charges himself with gross errors of technique such as may occur from carelessness in preparing of hands, the instruments, the gloves and the other impedimenta used in the process of delivery. Infection in hospitals from such sources is probably very rare and I believe that for the most part we can in conscience give ourselves a fairly clean bill of health on this score. I fear however that sometimes, after we have prepared the patient and ourselves in the most approved aseptic manner, contamination of the sterile hands, table and instruments may occur from bacterial flora of the upper respiratory tract by inadequate masking of our mouths and noses. How often have we seen distinguished and conscientious operators standing over an open abdomen with mouths carefully covered with masks while the equally infectious nose is left naked? For myself, I cannot see that there is any choice in having one's abdominal cavity infected by secretions from the mouth or secretions from the nose. If I were the victim from an esthetic standpoint alone, I would prefer the former.

The type of mask used occasionally deserves criticism. I think it will be conceded that masks consisting of a few layers of loosely woven gauze are not adequate protection from a strictly aseptic standpoint. Personally I prefer a mask made of finely woven broadcloth in two or three thicknesses over the mouth and nose as it affords as great a degree of protection as can be expected from a pervious textile.

In addition to the process of masking at the time of delivery I believe as Dr. Fisher stated in his discussion and Dr. Goethals suggested to Dr. Shipton that maternal mortality and morbidity would be greatly improved if those who have anything to do with the exposed genitalia of the patient were adequately masked at all times.

Our greatest difficulty will be in keeping away from our puerperal patients especially in the months of high incidence of respiratory infections, all those who give evidence of harboring organisms which we



not only deaths which are listed as diabetic in the city's vital statistics, but also those which would be listed as other than diabetic because of the priority which other diseases in the same person have over diabetes in the Manual of Joint Causes of Death. In a recent study of diabetic epidemiology Joslin and Lombard showed that 13 per cent of cases with the word diabetes on the death certificate are otherwise classified. Another fact brought out by them is

TABLE 1  
CAUSES OF DEATH

Coma	41	(13.6%)
Arteriosclerosis	179	(59.5%)
Cardiac	91	
Nephritis	3	
Apoplexy	40	
Gangrene	41	
Cardiorenal	2	
Generalized	2	
Infections	54	(17.9%)
Bronchopneumonia	17	
Lobar Pneumonia	7	
Abscesses	5	
Carbuncle	4	
Pulmonary Tuberculosis	3	
Pyelonephritis	3	
Prostatic Abscess	2	
Appendicitis	2	
Infection of foot	2	
Cellulitis of leg	1	
Cellulitis of face	1	
Osteomyelitis	1	
Parotitis	1	
Mastoiditis	1	
Septic knee		
(postop pneum)	1	
Urinary infection		
(with septicemia)	1	
Peritonitis	1	
Gall bladder dis	1	
Miscellaneous	27	(9.0%)
Diabetes or unclassified	9	
Cancer	8	
Valvular heart dis	2	
Cirrhosis of liver	3	
Fracture of leg with sepsis	1	
Fracture of patella		
(pulm emb)	1	
Intestinal obstruction		
(with gall stone)	1	
Multiple injuries	1	
Insulin shock	1	

that 24 per cent of diabetics die without diabetes being mentioned on the death certificates. Diabetes ranks fairly high in priority among the joint causes of death but there are many paradoxical situations. When a diabetic woman dies following a cesarean section, the death is listed as one following a cesarean section. If, however, she dies as a result of an abortion it is listed as a diabetic death.

#### HOSPITAL DEATHS

Diabetes mellitus was mentioned on 301 death certificates in Boston during 1935. Of these

136 died at home and 165 died in hospitals. The hospital deaths were distributed among 23 hospitals, but 132 of the 165 died in the eight larger hospitals. Obviously most of the problems of diabetes can be studied from hospital experiences and the bulk of the material for study is concentrated in the larger hospitals.

#### NONRESIDENTS

Fifty-five of the cases were deaths of persons living outside of Boston, a factor which must be considered in evaluating death rates in a medical center.

#### NATIVITY

The large number of deaths among the foreign born is greater than would be expected from the per cent of foreign born in the city. Fifty-four and four tenths per cent of the deaths were among foreigners whereas only 29.3 per cent of the city's population in 1930 was foreign born. Ninety-nine of the 165 foreigners were Russian, Irish or Italian. In the 1930 census these countries were among the first four in the foreign born group.

#### SEX

A study of sex distribution reveals a surprising preponderance of females. The women outnumbered the men by more than 2 to 1—207 females, 94 males. The preponderance of females is especially striking in the group dying with diabetic coma in which there were 41 cases of whom 33 were females, a ratio of 4 to 1.

The increasing proportion of females among diabetics has been noted by Joslin. Of a thousand new cases seen by him during 1933-1934, 57.4 per cent were females. He mentions as possible factors the increasing attention given to females and their health so that milder cases may be detected more often among women, the higher incidence of obesity among women, and the influence of pregnancy. The last factor is brought out by Bolduan who showed that the preponderance of females among diabetics dying over 45 is marked among married and widowed persons but not among the single.

#### MARITAL STATUS

Single	42
Married	143
Widowed	109
Divorced	6

#### AGE

The average age of the whole group was 64.3 years, males 63.3 years and females 64.7 years. The most stimulating feature of the age distribution of the deaths is that no child died with diabetes. The youngest victim was 19 years old. The per cent of deaths in each decade is shown in chart 1. Chart 2 shows the age distribution of 1775 diabetic deaths in Boston between 1895 and 1913, made up from the figures reported by Dr. Herman Morrison.

is the hope that it will emphasize two factors of importance, namely the danger to other patients from atypical or subclinical cases of puerperal sepsis (possibly of endogenous origin), and that an orthodox (but really bacteriologically unsound) nursing technique—apparently harmless for many years—can be dangerous if the proper set of circumstances arise such as outlined in this brief report

DR ROBERT L. DeNORMANDIE, Boston I think Dr Shipton really must be congratulated on reporting this outbreak. The only criticism I have to offer is in regard to the hospital management. I think it should be very severely criticized for not telling members of the staff there were septic patients in that hospital and for letting other patients come in without telling the staff of this condition, and for their refusal to mask and help Dr Shipton to clear it up

CHAIRMAN KICKHAM I think Dr Shipton's paper one of the most important we have had today. Of course what Dr DeNormandie said applies more definitely to the larger hospital or to a hospital which has Chiefs of Staff and so forth I agree with Dr DeNormandie it was very hard to say the least to have those patients coming in and the hospital management not willing to cooperate but in the larger hospitals where there are Chiefs of Staff I think these epidemics may be better controlled than in the smaller hospitals with each man delivering his own patient. I know in St. Elizabeth's where I happen to be Chief of the Obstetrical Department, every patient—or any patient—probably that would be the better way to put it, who runs a temperature is reported to me as the Chief. Now I make a visit on the floor every day even though not on active duty I do not do any actual delivery now I think sometimes if the Chief of Staff would go on the floor with the understanding that all things abnormal should be reported to him he would have better control of what might be happening. This has proved so important that it resulted in stopping an epidemic in our own institution. Beginning on the first of May there was a change of personnel involving two or three of the nurses and the resident interns. In two or three days while a particular man was on duty, a patient was noticed to have a temperature. We did not mind one temperature but when in the matter of a week we had three patients with temperatures ranging from  $101^{\circ}$  to  $102\frac{1}{2}^{\circ}$  and one of  $104^{\circ}$ , then we began an intensive investigation.

In our hospital it has been customary for years that all nurses and all doctors are masked at all times they are in contact with patients whether the

perineum is exposed or not, the nurses wear masks even in the wards, all patients are masked when in contact with their babies. We began, as I say, an intensive investigation and the first thing we did was to begin taking cultures. On culturing we found this new intern had a positive streptococcus culture. Immediately, of course, he was put out of that particular department. We found nothing else and our epidemic stopped immediately. Fortunately the three cases we had quieted down. I mention this because I feel our trend of watchfulness there is important so that one in authority will know there is more than one, just as Dr Shipton feels and Dr DeNormandie feels should be done. Secondly, at the very beginning of the epidemic, when more than one patient shows temperature, then an intensive investigation, and, of course, carrying on as Dr Shipton very well said, and as I feel we all agree, with absolutely aseptic precautions so far as we can in contact with the patients at all times.

I feel though that Dr Hertig has brought out an intensely important thing, that is, that an atypical case might occur despite every precaution we might bring forward to prevent such things. Therefore, while I do not wish to minimize the importance of anything we as obstetricians can do, I think there is an irreducible minimum of infections and sepsis due to such cases as Dr Hertig reported, namely the atypical case that might start and spread before you can surely realize what is the causative factor.

I will ask Dr Shipton to close his paper.

DR GEORGE M. SHIPTON, Pittsfield I wish to express appreciation for being allowed to come here and present this paper. Also I extend my thanks to the gentlemen who have been so kind as to discuss it. Two weeks ago Dr Fisher and Dr O'Connor threatened to take me for a ride on this paper and whether they had an unusually good time here this afternoon or not, they weakened and I think let me off very lightly and I appreciate it very much. In answer to Dr DeNormandie's criticism, I do not want to blame this entirely on the hospital management. If you remember I said in the paper due to the advice of several men on the active staff, this matter was kept under cover and the masking was not permitted. One of the suggestions drawn from the paper that there should be more thorough cooperation among the members of the staff and the hospital management, I am happy to say has been brought about. We now have a set up similar to the one our Chairman has described and ever since that has happened there has been absolute cooperation.

CHAIRMAN KICKHAM Gentlemen—I thank you all for coming and we will adjourn until next year.

## DIABETIC DEATHS IN BOSTON DURING 1935\*

BY G. W. LYNCH, M.D.†

### INTRODUCTION

NO person under 19 years of age died with diabetes in the city of Boston during 1935. Only 3.4 per cent of the 301 deaths among diabetics were deaths of persons under 40 years. These encouraging facts present a striking contrast to conditions 20 years ago. At that time

This analysis of diabetic deaths in Boston was made under the auspices of the Massachusetts Tuberculosis League. The League was interested in ascertaining the nature of the problem of diabetes because tuberculosis and diabetes present epidemiologic and therapeutic problems of importance to public health.

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any child who developed diabetes usually died within a year or two of the time of onset. Of deaths due to diabetes in Boston between 1895 and 1913, 19.8 per cent were deaths of persons under 40 years of age.

This survey represents an analysis of the deaths of all persons dying in the city of Boston during 1935 whose death certificates contained the word diabetes. Information concerning them was obtained from death certificates and was augmented by further facts found on hospital records or given me by the doctors who signed the certificates. The study includes

her in coma, the urine contained a large amount of sugar, and she died in spite of insulin

Of the 54 cases in the infectious group 24 were due to bronchopneumonia or lobar pneumonia. This group, of course, does not include pneumonias which were a distinctly terminal event in other conditions such as gangrene or apoplexy. There were only 4 deaths due to carbuncles and 3 due to tuberculosis two well-recognized former enemies of diabetics

#### COMA

There were 41 coma deaths, 13.6 per cent of the whole group. One might more properly say these people died *with* coma rather than *of* coma because of the fact that 11 had complicating conditions which of themselves might have caused death. The complications are as follows:

Fractured hip	1	Septic finger	1
Gangrene	2	Carbuncle	1
Bronchopneumonia	2	Septicemia	1
Lobar pneumonia	1	Hypoglycemia	2

It is fair to count the 2 cases of hypoglycemia as coma deaths because in both instances the hypoglycemia was a complication developing in the treatment of the coma.

Of the 41 coma cases 33 were females. I cannot account for this preponderance of females other than as in the discussion above under sex. Of course the number of cases in this series is small but a similar preponderance of females occurs in the series of coma cases treated by Dr. Joslin and his associates.

The average age for the coma group was 58.9 years, lower than the average for the entire series, but sufficiently high to indicate that coma deaths are rare among the younger diabetics.

#### MISCELLANEOUS

In the miscellaneous group there were 27 deaths. Nine of these were listed as "diabetes." They were cases so classified by the person who certified them and sufficient information was not available to make a more accurate classification. They might more properly have been called "unclassified" but they are deaths of persons with diabetes which seemed to play a major rôle in terminating their lives. The only information available on some of these was "he just passed out."

The number of cancer deaths was 8. This is a rather low figure for the age group which this series represents. However it is a small series and, when a person dies with cancer, mild diabetes may seem so insignificant that it is not mentioned on the death certificate.

There were no deaths due to complications of pregnancy. There was only one death due to insulin shock, although hypoglycemia was really the terminal event in 2 of the coma cases. It is reasonable to assume that if they did not get coma they would not have died of hypoglycemia.

#### OPERATIONS

Forty-one of the people who died had operations during the terminal illness. No attempt has been made to select the cases which might be called operative deaths. Many of them were extremely poor risks, entering the hospital with disease which had progressed to a very advanced stage. Most of them were cases of gangrene.

#### AUTOPSIES

There were autopsies in 21 cases or 7 per cent of the whole series. All of these were hospital cases so that the percentage for hospitals was 12.7 per cent. This figure is quite low but probably about what would be found for any other disease similarly investigated. It is reasonable to suppose that the percentage of autopsies will be increased in Boston owing to the increasing interest in the treatment of diabetes and the more general appreciation of the value of autopsies. Outside of hospitals and outside of Boston, it will be easier for physicians to obtain autopsies, since Dr. Shields Warren, pathologist at the New England Deaconess Hospital, has agreed to arrange for such examinations anywhere in the state of Massachusetts.

#### PREVENTABLE DEATHS

There is no justification for attempting to select the cases which might have been saved because all the circumstances surrounding a death are not recorded on the death certificate or on the hospital records. Certainly diabetics cannot be expected to live forever. This study shows that most of them live to a reasonable age (average 64.3 years) and do not die of diabetes *per se*.

However, coma deaths must always be considered as preventable just as are deaths from diphtheria. Some of the outstanding features of the coma deaths are listed:

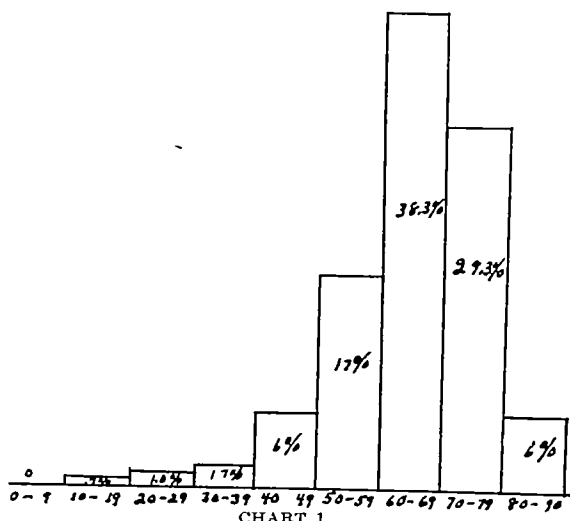
1. The average dose of insulin was relatively small and in some cases "buffered" by unusually and unnecessarily large amounts of intravenously or subcutaneously administered glucose. On the other hand 2 patients died from hypoglycemia developing during the course of treatment of coma.

2. Failure to utilize laboratory tests seemed to be a contributory factor in many cases. Some coma cases had no blood chemistry determinations, others had only a single blood sugar report and in a few cases the blood chemistry reports were not available until after the patient's death.

3. Delay in seeking treatment was responsible for several deaths. Some had been in severe acidosis for long periods before going to the hospital. Failure on the part of the family to realize the seriousness of the condition caused

## DURATION

The average duration of the disease was 7.4 years for the 197 cases in which there was definite information concerning this feature. There was a tendency for the use of "round numbers" in recording durations as shown by the fact that

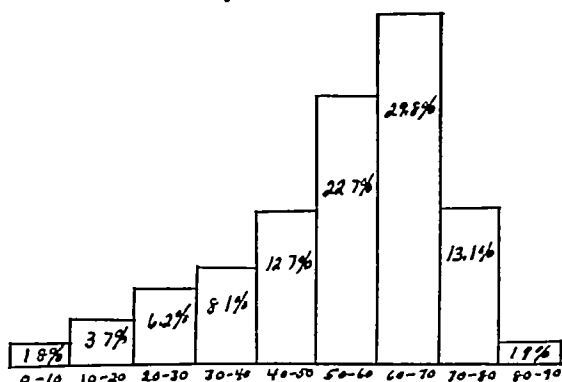


1935  
Deaths by Decades

there were 24, 19, and 16 cases of 5, 10, and 15 years' duration respectively as compared with 11, 0, and 2 cases of 6, 11, and 16 years' duration.

## CAUSES OF DEATH

In studying the causes of death I have employed a classification devised by Dr Howard Root for the analysis of the Joslin series and



1775 Diabetic Deaths  
Boston—1895 to 1913  
Age at death by decades

also used by the Metropolitan Life Insurance Company in compiling the Joslin statistics of diabetic deaths. All cardiac deaths except those which are valvular or infectious are included under the heading of arteriosclerosis.

In table 1 there is a complete list of all the causes of death. A diagram in chart 3 shows

the relative importance of arteriosclerosis, infection, coma, and miscellaneous causes.

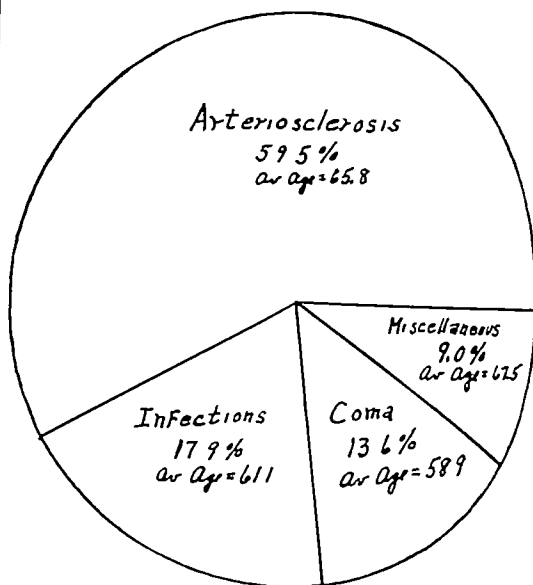


CHART 3  
Deaths Among Diabetics  
Boston—1935  
Total=301

## ARTERIOSCLEROSIS

Arteriosclerosis was the chief killing agent, being responsible for 59.5 per cent of the deaths. Of the 301 deaths, 169 were attributed to arteriosclerosis. In this group the heart was of first importance with 91 deaths as compared with 41 deaths due to gangrene and 40 attributed to apoplexy. Of the 91 cardiac deaths 35 were considered as coronary occlusion and 2 more were certified as due to angina pectoris. The remaining 54 were cases of chronic myocarditis, hypertensive heart disease, or "cardiac decompensation." There were no cases of congenital heart disease, luetic heart disease, or pericarditis recorded. Two cases of valvular heart disease are included in the miscellaneous group. In the group listed as due to gangrene it has seemed fair to include cases in which the patients died of terminal pneumonia or septicemia obviously secondary to the gangrene.

## INFECTIONS

Infections accounted for 17.9 per cent of the deaths. This is a reasonable figure in view of the well-recognized susceptibility of diabetics to infection. The surreptitious action of infection in precipitating or aggravating diabetes was well illustrated in one of the coma deaths. A 60 year old female was seen by a doctor who found that she had a carbuncle. She told him that she did not have diabetes and that only one week before she had had an urinalysis and had been told that it showed no sugar. A few days later when the doctor made his visit he found

ber of that body in so far as he has to be called to the scene of a crime. The question of whether cases of sudden, unexpected death, by suicide as well as from natural or violent causes, come under the jurisdiction of the medical examiner is likewise a matter of local or state regulation. These cases include all persons who die on the street or are fatally injured by motor cars or accidents of any kind. Although no such law exists in Germany, in the Berlin Institute these cases must be examined as a matter of routine.

In Austria a law requires the autopsy of every patient dying in a hospital. Only when the suspicion arises during the autopsy that the death may be due to a crime, must the district attorney or the police be notified. The autopsy then under way must be stopped until the body is taken over by the police and it must be completed by the medical examiner, a competent judge or district attorney attending, if desired.

Naturally the autopsy alone cannot always explain the cause of death. To determine this, one must frequently await the result of the microscopic and chemical investigations. Almost every forensic institute in Europe employs one or more histologic technicians and has a special toxicologic and chemical department. The chief of the latter, who generally has a Ph D degree in chemistry and toxicology and very often also an M D degree, not only has to do the chemical and toxicologic parts of an autopsy, but is also kept busy by various examinations of suspicious material sent in by the police or by private individuals. Furthermore, since the examination of the alcoholic content of the blood of drunken drivers or pedestrians is widespread in Europe, the Widmark test usually belongs to the sphere of the forensic chemist. The chemical and toxicologic interpretations of the results of examinations of autopsy material are usually given in court by the chemist himself. He explains his methods, their reliability and his findings in the special case as compared with his former experience with similar material. But the medical examiner who performed the autopsy must make clear the medical significance of the chemist's findings. It is his special task and duty to discuss the problem in question and to come to a final forensic conclusion for the consideration of the judges and the jurors. From this it is easily understood that only a thorough toxicologic knowledge and experience enable the medical examiner to meet these requirements. There are very few men who, like H. Zangger in Zurich to whom legal medicine is indebted for a number of fundamental chemical and toxicologic investigations especially in problems of industrial poisoning, combine the experience and training of a chemist and of a medicolegal pathologist.

In addition to problems concerning pathology, chemistry and toxicology, there are bacteriologic and especially serologic questions of great practical importance which must be answered by the student of forensic medicine. The criminologic examinations of dried blood stains, of hairs and of sperm stains play a significant rôle in the daily routine work of every forensic institute in Europe. The possibility of excluding certain blood group combinations in cases of questionable paternity by means of the four classical Landsteiner groups and the newer subgroups has created new problems. In almost every European country the courts in a steadily increasing number, use this method as evidence in legitimacy and the resulting perjury cases.

The scope of criminologic problems which may be solved by the medical examiner in Europe does not end with the above mentioned laboratory work. Dependent upon the special inclination of the director of the institute it is common practice in forgery cases to compare handwritings, signatures and important business letters. Sometimes the professor is a ballistic expert or a specialist in problems of identification or of electropathology. Very often these specialties originate as a result of a difficult practical case in which the police, in Europe not less overburdened than here, seek the support of forensic science for the solution of some new and unexpected problem.

In still another field the co-operation of forensic medicine with the police and the courts has become indispensable in many European countries, namely, in forensic psychiatry. Questions of personal responsibility in civil and criminal lawsuits must be decided. The credibility of witnesses must be examined. Briefly, the whole work which must be done by the alienist in this country belongs to the medical examiner in Europe. As an illustration, in the Institute for Forensic Medicine in Berlin, an examination was made of the credibility of all juvenile witnesses of greater Berlin who were obliged to appear in the courts in cases of sexual crimes of every kind. As a routine requirement an opinion also had to be obtained about many of the defendants in these cases. As a rule, these persons came to the Institute never less than three times, often more frequently. But not infrequently they had to be visited in a lunatic asylum, in one of the psychiatric clinics or in the prisons. Thus a tremendous amount of psychopathic and psychiatric material was reviewed for practical and research purposes. All kinds of drug addicts with their special misdemeanors and crimes are also seen by the forensic specialist.

Many of the problems so far described, especially autopsies in accident cases and the psychiatric examination of patients, are also of

the delay in many instances and one patient relied upon a cultist until it was too late

4 In a few cases no insulin was used because of a feeling that the patient was beyond recall or because of objections on the part of the patient or the family

5 Some patients died in spite of what must be considered excellent treatment although again treatment was begun too late. Diabetic coma is a severe endocrine crisis which certain patients are not prepared to withstand unless diagnosis is established and treatment begun early in its course. We must expect a certain number of deaths just as we do in major surgical procedures conducted in a meticulous manner

Following the discovery that nearly half (132) of the total deaths from diabetes in Boston occurred in eight hospitals the importance of the hospital management of diabetes became obvious. In preparation for a meeting of the representatives of these hospitals the records of the deaths in which the likelihood of improvement in treatment might be possible were closely scrutinized and abstracted. The cases were so prepared as not to disclose the identity of the patient or the hospital and were passed about to the different representatives and an evening given over for their discussion. The opinion of those present was unanimous—that for the year 1936 what might in the end do the most good for diabetes in Boston would be con-

centration upon improvement in hospital treatment. As an outgrowth of the discussion, the representatives of these hospitals felt that in each hospital arrangements should be made so that it would be possible to secure laboratory data more promptly and a better systemization in each hospital of the treatment which the staff of that hospital believed desirable for coma

#### CONCLUSIONS

During 1935 there were 301 deaths among diabetics in Boston. No child died with diabetes and 34 per cent of the patients were less than 40 years old at death. The average age was 64.3 years. Two-thirds of the victims were females. More than one half of the patients died in hospitals. The causes of death were arteriosclerosis 59.5 per cent, infections 17.9 per cent, coma 13.6 per cent, and miscellaneous 9.0 per cent.

The results of treatment of diabetes have greatly improved in the last 5 years. Further improvement depends upon the following:

- 1 Earlier treatment of coma, gangrene, and infections
- 2 Reports of blood and urine in diabetic emergencies within one hour of admission to the hospital
- 3 More postmortem examinations
- 4 Reduction of postoperative mortality
- 5 Prevention of deaths under 40 years of age

## FORENSIC MEDICINE IN EUROPE—LEGAL MEDICINE IN AMERICA\*

BY KURT E. LANDÉ, M.D.†

IN trying to give a picture of forensic medicine as it is practiced and taught on the European Continent, one might be tempted to treat the present structure of this specialized branch of medicine from a historical angle. But such an undertaking would lead too far afield and include too many unnecessary details.

I must therefore restrict myself to a short survey in which I think it is better not to lay great stress on the differences between the individual countries but rather to point out the common elements in the Continental systems of forensic medicine. Only a few details, which perhaps are foreign to American thought or very divergent from the American administration of justice, need explanation.

Forensic medicine involves all the questions where medical science comes into contact with

the law. But this is too general a definition to explain sufficiently the manifold duties which must be performed by the European medical examiner or judicial physician. Enumeration of the different kinds of work to be done for quite different law enforcing agencies will give a clearer impression.

In order to assist the police in the detection of various crimes, autopsies must be performed in the institutes of forensic medicine, where the medical examiners in the larger cities are usually located. These must be carried out on all cases of homicide and whenever the slightest suspicion of an unnatural cause of death arises. Whether these medicolegal postmortem inspections can be performed by the medical examiner's own authority or whether he has to wait for the order either of a competent judge or of the district attorney depends upon the rules and regulations of the different cities or states.

It may be remarked here, that, wherever a special homicide squad is organized by the police, the medical examiner is an official mem-

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The police, the courts, the insurance boards or whoever else demands or requests the aid of the medical examiners regularly or for a special problem send their records to the institute with the request for the desired examination or autopsy. The incoming cases are distributed by the director among his coworkers according to the type of the case and according to the official duties and interests of his assistants. Since the institutes are generally situated in the same building as the city mortuaries the medicolegal autopsies can be performed without much waste of time.

In the majority of cases the patients who are examined come to the institute by special appointment. The only interruptions which are unavoidable are sudden calls of the homicide squad and, of greater importance subpoenas from the courts. In the larger institutes, however, several assistants generally are present and able to substitute for one another.

Of course the above description of a rather extensive forensic institute with several assistants, technicians, dieners and clerical help is correct only for the larger cities on the Continent. The smaller universities in Germany as well as in France, Italy and elsewhere have to be content with a smaller staff and less room and equipment, but, on the whole, they are organized in a similar manner.

In districts where there is no university there is usually one medical examiner on duty. For special investigations he has to rely upon the nearest forensic institute. In Germany, as well as in most European countries, the tendency exists to appoint one well-trained full time medical examiner for a large district which includes several rural counties. Such a system eliminates the prevailing situation that results in smaller cities and rural counties, in the state public health officer having to engage in forensic tasks for which he is unqualified.

We now come to the third and last of my three questions which concerns the forensic training of the future medical examiners. I think it will be appropriate to outline the teaching of forensic medicine for the undergraduate students in the Continental universities.

So far as I know the first obligatory course was that adopted by the University of Vienna in 1803. Later on, the curricula for students of medicine generally required the attendance at, or perhaps more exactly the payment for lectures in forensic medicine. In Germany a definite change from paying to attending took place when, in 1926, forensic medicine became one of the subjects which had to be passed as part of the state board examination.

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great significance for the compulsory accident, health and other forms of social insurance, found as they are in some form or another in almost every European country. Therefore, not only the civil and criminal law courts and the police but also the different boards of the social insurance groups seek expert advice from the institutes for forensic medicine or from the individual medical examiner. Likewise, the private insurance companies consult the university institutes more and more frequently in complicated cases.

I may finally add that in some countries the medical examiners are also charged with the duties of prison physicians and that they have to examine those persons who claim not to be in a position to appear in the courts or to stand a prison term.

I have not covered the ground completely, but at least I have outlined the essential functions of forensic medicine as found in Continental Europe.

In view of the multitude of different and partly heterogeneous topics belonging to the domain of forensic medicine in Europe, the following three questions may now be asked:

1. Why are so many and such different fields included in forensic medicine?

2. What form of organization guarantees smooth functioning of the medicolegal machinery?

3. Where and how is the necessary training for this important specialty acquired?

As to the first question, it may help to go back into history in order to explain very briefly the development which resulted in modern forensic medicine. In the codices of Charles V, the so called *Lex Bambergensis* of 1507, and the *Constitutio Carolina*, elaborated by Johann von Schwarzenberg, medical evidence was made imperative through more than one provision. During the medieval centuries and later on, numerous cities had physicians in their services as health officers. Under given circumstances these physicians also had to render expert opinion in the courts about medical questions, even if it concerned only the trial of a poor witch.

From the very beginning there was a close connection between the medicine practiced by the official medical officers and the courts and the police. This close connection did not change when, in the course of the nineteenth century, a separation of forensic medicine from public health or hygiene took place. This change started in the universities of Austria under the influence of the Viennese school and in France under that of Paris and was followed by Sweden, Italy, Germany and Switzerland. It became customary for the courts to consider as experts in forensic medicine only those physicians who, in the cities with universities, were

the professors of forensic medicine, or, elsewhere, as health officers, were in charge of forensic problems. When, in the beginning of the twentieth century, in Prussia, forensic medicine was included as a compulsory lecture in the curriculum of the medical students, the state in several cases appointed the local health officer as professor of forensic medicine. He also acted as official medical examiner.

As new problems appeared, such as the significance of serology for medicolegal questions, the courts and other governmental boards appealed, as usual, to the forensic institutes for their expert opinion. A similar situation partly explains why forensic psychiatry is practised to a large extent by the medical examiners. The supervision of the psychiatric hospitals belonged to the sphere of the health officers, at least in Germany and Austria. In some countries, as in Italy, psychiatry is not practised by the medical examiners, and some of the elder professors of the Viennese school, who came directly from the field of pathologic anatomy, refused to work in psychiatry.

A more recent example of the natural expansion of forensic medicine is the inclusion of industrial hygiene, or more accurately industrial pathology, in the medicolegal field. Dr Zangger of Zürich was one of the first men, who, owing to his practical experience at the medicolegal autopsy table, saw the ever-increasing importance of industrial accidents. Especially the dangers of the newer industrial chemical solvents, whose composition was usually kept secret, attracted his forensic curiosity. It was in his institute that fundamental investigations about the danger of acute or chronic industrial poisoning were carried out systematically for the first time.

I only refer briefly to the duties concerning the investigation of motorcar accidents and of industrial accidents of every kind and to their far-reaching juridical consequences. All these practical and scientific problems fall automatically into the field of forensic medicine, because of its existing organization.

This brings me to my second question, namely, what form of organization guarantees smooth functioning. It would take too much time to give a detailed description of the medicolegal organization of every country in Europe, but I think it worth while mentioning the following typical component parts. In cities where there are universities, the director of the institute of forensic medicine is either the only or one of several medical examiners for the district. Such an appointment is automatic because the universities are state institutions and the incumbent of every professorship is a state official. If there are several medical examiners as in Vienna, they are generally associated with the institute as department chiefs or assistants.



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training, although of long duration, is economically possible because a good worker is often able to obtain a paid position from the beginning, after having finished his clinical internship.

In the institute itself the assistant does the routine work and starts research problems, in which he has had a special training or in which his superior is particularly interested. After some time, he begins teaching students according to his abilities. In Germany he has to pass the public health officer examination in order to become eligible for the position of medical examiner. This examination can be compared to the civil service examination in this country. Whether, after such training, a physician decides to stay in the university institute with an academic appointment or whether he prefers to go into a medical examiner's position outside the university, is merely a matter of personal choice.

I should like to add a few words about the position of the medical examiner as expert in the courts. Being a state official and being paid by the state, even though poorly, as is the rule, the medical examiner is strictly forbidden to practice medicine. Nor is he allowed to examine patients at the request of a private lawyer who would like the opinion of an official expert for nonofficial purposes. He must devote his whole time to his job, and, as a non political state official, he is financially practically independent. In the courts, whether summoned by the district attorney or the judge, he is the expert par excellence. Very often he is questioned and hard pressed by the lawyer of the defendant, but his position as impartial expert before the jury for the defendant and the district attorney gives him the protection of the court against unjustified attacks, which may be attempted from time to time.

The court has the right to subpoena experts other than the medical examiner assigned to the case. The latter often suggests the consultation of a specialist in difficult cases. Such a request is not derogatory to his position as impartial expert for questions of a medical nature.

I emphasize these facts because in my opinion they form some of several reasons why forensic medicine in Europe has had a good opportunity to develop and to attract able, well-trained physicians.

The development of medicolegal medicine in the Anglo-Saxon countries has been totally different from that described for the European continent. As outlined very instructively in Dr. Leary's paper<sup>1</sup> about the Massachusetts medicolegal system, the so-called coroner's system had come into existence in England in the early medieval ages. Later on it was adopted in the

New England settlements. Speaking here in Massachusetts, the first state in this country to abolish the coroner's system in order to replace it, in 1877, by a modern medical examiner's system, it is perhaps worth while to outline briefly the principal differences between the two.

Ideally the medical examiner is selected from the civil service list. He should be a physician who is well trained in pathologic anatomy. In New York, for instance, he has to produce proof of having performed at least 150 autopsies. Appointments in Massachusetts are made by the Governor.

The duties and powers of the medical examiner vary somewhat in different localities. In Massachusetts, he must view the body of any person supposed to have come to death by violence and, if, in his opinion, further examination seems desirable, he must perform an autopsy, after due authorization, usually by the district attorney. The more recent charter of the City of New York, drafted in 1915 and put in effect on January 1, 1918, gives considerably greater independence and autonomy to the chief medical examiner and his associates than exist in Massachusetts. They have the right to hold hearings and to hear witnesses if they believe this to be essential for throwing light on a mysterious case. Of even greater importance is the regulation that the chief medical examiner and his coworkers have under their supervision not only the bodies of persons who have died suddenly from violent or natural death but those of all patients in hospitals who died within the first twenty-four hours after admission and those of all individuals who died at home without having been under the care of a physician. In all these cases the medical examiner alone decides whether an autopsy is to be performed. It is in his discretion to make out a death certificate with or without an autopsy, unhampered by any political pressure. The advantage of such independence is impressed upon everyone who formerly had to work under other conditions, where, even with the best cooperation of the district attorney, friction was at times unavoidable.

Unfortunately there are not many communities in this country like Massachusetts, some other New England states, New York City and Essex County, New Jersey, where a modern forensic system is found. Elsewhere in the United States the coroner's system predominates. Under the coroner's system a politically elected or appointed official, not always of the legal, much less of the medical, profession has to render decisions regarding the cause of frequently very complicated cases of sudden violent or natural death. It is at the discretion of the coroner and the coroner's jury when and by whom an autopsy should be performed. Being a politically appointed officer the coroner

is often guilty of selecting unqualified physicians for difficult postmortem examinations that require the skill and ability of a trained forensic specialist

In some of the larger cities, the selection of the coroner's physician is limited to a list of well-trained pathologists, presented by the local medical association. But even this achievement was gained only after a long struggle on the part of the medical associations. The disadvantage of the above compromise is clear. The decision, whether a case is suspicious and whether an autopsy has to be performed, lies completely in the hands of not only inexperienced but not infrequently prejudiced laymen. It is not the scope of my lecture to comment further on this situation or to discuss what could and should be done about it. The leading crusaders against the existing conditions such as Dr. Schultz, the late Dr. Norris and Drs. Gonzales, Vance and Gettler from New York, Dr. Martland from Newark and Drs. Magrath and Leary from Boston, have collected so many terrible examples of the misinterpretation of clear-cut facts by the coroners that it is superfluous to introduce more details.

The following facts are of main interest to us in comparing the Continental European with the American situation. Throughout the Continent we have had the steady, even if slow, development of a medicolegal system created by the needs of the law-enforcing agencies of the state and other governmental boards. The medical examiners themselves are state or city officials. In this capacity they are frequently connected with state universities and, if so, are able to use a high percentage of the material for teaching purposes.

In the United States, on the other hand, we have in only three relatively small areas, though they are important and influential, a system that is as effective as the European. The oldest American regulation has been in effect for fifty-nine years, the youngest for eight years. Although in Boston and in New York City the medical examiners are connected with the universities, this connection between practice on the one hand and research and teaching on the other is not so close as it is in Europe. One of the chief reasons for this, in my mind, is the fact that the American universities, as well as the English, are predominantly private institutions. This raises the question as to how far it is permissible to utilize official material in teaching in a private institution. Even in Boston and New York opinions of the public of the undertakers and of the courts must be considered to a greater extent than is necessary abroad.

It is of importance in explaining the different development of forensic medicine in Europe

and here to realize that American medical education has undergone many changes of organization in the last two decades. More urgent tasks had to be undertaken before an entirely new specialty could be added to the curricula of the medical schools. Moreover, this new specialty could not very easily be separated from other subjects such as pathology, bacteriology, serology, obstetrics and psychiatry. Furthermore, the interest in forensic medicine in the universities of this country appeared at a time when American medicine had definitely taken the lead from Europe. Experience had shown that only intensive specialization was the basis for the many scientific achievements for which humanity is indebted to American medicine. It may easily be seen from this that a specialty like forensic medicine, in the European sense, was looked upon with more or less justified distrust. Too many heterogeneous subjects were involved.

Catton,<sup>2</sup> in an outline for a university institute of forensic medicine, recommends the incorporation in the teaching staff of a professor of law, of psychiatry, of medicine, of pathology, of pharmacology, of surgery, of gynecology and of obstetrics, a superior court judge, the coroner of the county, the medical director of the industrial accident commission, some attorneys at law and some doctors of medicine, all as special lecturers in legal medicine. This plan demonstrates how far-reaching the specialization would be if all the subjects that are included in a European lecture course in forensic medicine, were to be taught in one forensic institute. Furthermore, Catton recommends not a specialist in forensic medicine—as the medical examiner or the coroner's physician—as director of such a hypothetical institute, but a psychiatrist or pathologist of the university.

I am a little afraid to state my own opinion about these problems because I have some doubt whether, as a foreigner who has been here two years only, I have the right to do so. Moreover, I am told that not infrequently the objection has arisen that it is inopportune and undesirable to import European ideas into this country. Whether that applies to medical subjects or whether the objection is restricted to the political and economic fields I really do not know. In spite of these inhibitions I should like to say a few words about medicolegal practice in this country, particularly with reference to the situation in New York City where, since September, 1934, I have had the opportunity to gain some practical experience being assigned to the office of the Chief Medical Examiner.

I do not believe that the present limitation of medicolegal medicine to the pathologic and toxicologic fields, as it is in New York, is sufficient to give an impetus for its further development in America. As long as every patholo-

gist thinks he can, if necessary, perform a difficult medicolegal autopsy without any special training other than the experience he has gained in routine pathology, he will not concede that forensic medicine exists as an important specialty in itself. It seems to me necessary that, in order to inspire a greater interest in forensic medicine in the medical profession and medical students, some of the other tasks mentioned in the first section of my paper should be included. For the time being the inclusion of psychiatry is out of the question, but even without it much could be done.

In order to develop the laboratory fields it is necessary to obtain the full cooperation of the law-enforcing agencies. Forensic medicine is no independent research subject. The problems of daily medicolegal practice are the elements from which to start. I think it should be possible to get more cooperation than now exists.

The police departments of many larger cities do not yet possess scientific laboratories of their own, and it is difficult to teach the detectives and inspectors where and when they can expect help from forensic medicine. As an illustration of practical difficulties let me mention that, despite the arrangements made in anticipation of material for blood group tests on dried blood stains in the many homicidal cases of New York City, we were able to get only three or four specimens for practical investigation in one and a half years.

I am mentioning these details because I want to refer to them again in the last part of this paper when speaking about the teaching of forensic medicine. Let me refer to another difficulty which at least in New York City, happens often enough. A large number of autopsies in which insurance of one kind or another is involved are performed in the office of the chief medical examiner by him or his assistants. The experiences gained by the medical examiners through their special activities could be of great value for the insurance companies. But, while the European institutes for forensic medicine not only autopsy the cases but also work them up from every necessary angle for private as well as for public insurance, in New York the procedure is entirely different. The autopsy records are on file and accessible to the public. They often are interpreted in the courts by physicians who not only did not witness, but much less perform, the autopsy. These physicians are perhaps experts in other branches of medicine than those pertaining to the medicolegal field. In this way material that could be of great value for practical, scientific and teaching purposes is lost.

In the first part of this paper I mentioned the position of the European medical expert in the courts. Let me now refer briefly to the position of the American experts and its practical

consequences for the development and teaching of forensic medicine. The judicature in the Anglo Saxon countries is built on an entirely different system from that of most Continental European countries. We thus need not be surprised that the position of an expert here is totally different from that abroad. Much has been written in the American legal and medical literature about the duties, the rights, the behavior and the treatment of expert witnesses. I am sure that Spillman<sup>3</sup> gives too pessimistic a picture of the situation of the medical expert witness. It is a fact, however, that in this country the physician, whether he be a clinical specialist or a medical examiner, can give his opinion as an expert witness concerning the case pending in the court only by answering the questions of the lawyer or the district attorney. Sometimes, in the special form of an answering hypothetical questions, he has an opportunity to explain his scientific opinion about a case in as much detail as he desires. But the written opinion which plays a dominant rôle in the work of his more fortunate European colleagues does not exist. There exists for the American medical expert no obligation to draw conclusions from his scientific work in the form of an exposé of the history of the case or of his actual findings during the examinations of the body or of the patient. Thus he lacks the highly important opportunity to give a reasoned account of his work in the forum of the court.

There is still another point of importance. In American law the expert witness acts as a witness for one party, which, in criminal law suits, is either the district attorney or the defendant. In civil suits the situation is very similar. The scientific conclusions of the expert are not supposed to be impartial, but to support the side which retains him. Of course, the medical examiner, who has performed an autopsy in a homicide case and appears in the court as an expert witness of the district attorney, will generally have no difficulties. Only a very audacious lawyer would doubt the examiner's impartiality in recording his findings. But, with a civil suit, the situation is entirely different, and here the advantages of the independence enjoyed abroad by the expert in forensic medicine become obvious.

I now come to the consideration of the teaching of forensic medicine in America as it exists today and as it should or could be. We have seen that the situation in this country is more complicated than in Europe. If the teaching of forensic medicine is to become more than a simple, colorless introduction into mere facts, then there must exist some form of close personal relation between one or several medical schools and the medical examiner's office. Even then only one of the essential conditions for a

useful course in forensic medicine will have been complied with. The practical material in the form of autopsies, laboratory problems and specimens ought to be available. Such conditions exist in Boston and in New York.

In New York one medical examiner lectures at the College of Physicians and Surgeons, Columbia University. Another gives a course of 11 hours for the fourth-year students of Cornell University Medical School. At the New York University Medical College the lectures are divided among the heads of the forensic department of the school, Dr Martland, Dr Gonzales, Acting Chief Medical Examiner of New York City, Dr Gettler, Toxicologist of the Chief Medical Examiner's office and Dr St George, Assistant Director of Bellevue Hospital laboratories. The students of the last year are required to attend these lectures, aggregating 6 hours in all. Students and postgraduate students who are especially interested can voluntarily attend eleven more lectures where special problems, such as death due to shooting, to stabbing, or to natural causes and other subjects, are given in more detail. Only two students in 1935 and one in 1936 chose forensic medicine as elective work.

At present the tremendous autopsy material is used only very occasionally and not at all systematically for undergraduate teaching in medicolegal medicine. One lecturer in pathology at the Columbia University Division in Bellevue Hospital obtained permission through the courtesy of the chief medical examiner for the use of the material for demonstrations in his course of pathology. These third- and fourth-year students know at least enough of the necessary elements in pathologic anatomy to get something from these cases, but generally, the forensic viewpoint is of less importance to them and to their instructor than the purely pathologic findings.

Groups of second-year students from another medical college are as a rule not yet able to appreciate the importance of forensic facts, even if carefully demonstrated. We had planned for the first time this year to inaugurate a small elective course in forensic laboratory methods in the last of their second year for students who had finished their course in pathology. Although some interest was displayed, the project could not be realized because of an autopsy infection of the lecturer. It would however, be preferable if the students had finished their third year before taking this course. It would also be better if they had previously attended lectures in forensic medicine.

The training of postgraduate students in legal medicine is a difficult problem. It has been tried in the New York University Medical College. Instruction has included lectures dealing with gross and microscopic

medicolegal pathology, forensic laboratory methods and the more general aspects of medicolegal medicine. Occasionally there have been opportunities to do autopsies, to accompany the chief medical examiner on homicide calls or to go with assistant medical examiners to inspect suspicious cases of death. As a rule, these students are practicing physicians and are able to devote only a few hours in the morning to their studies. Furthermore, the majority have had little or no training in pathology and, consequently, the training that they received during the six months of instruction was somewhat inadequate.

Every member of a postgraduate course in medicolegal medicine should have had some training in pathology, at least equivalent to a six months' internship in a department of pathology in a large hospital. I personally believe that such students would get more out of the course if they had to write autopsy protocols regularly and if they had to do practical work using different methods which have been taught. It would also be of some value, if they were assigned to some special practical problem and had to refer to the literature. I am rather doubtful, whether the average practitioner, even if he attended a course of this sort for one full year, would gain enough experience to become a medical examiner. If former residents in pathology and coroners' physicians would attend these courses they would learn much more rapidly than the average practitioner and their training would be a very valuable addition to their knowledge of pathologic anatomy.

This leads to the question whether for the time being more should be tried or could be expected from a training in forensic medicine in the United States. The most reasonable answer is "no" for no paid positions in institutes similar to those in Europe are available. The incentive of a full-time, academic position is lacking. Under the present conditions the medical examiners and coroners' physicians from sheer necessity, should be chosen from the pathologists. If they have had additional training, as recommended above, they obviously have all they need to fulfill the present obligations in the medicolegal field satisfactorily.

The situation could be changed only if the civil service examinations for the position of medical examiner were not to remain purely pathological. If they included questions actually related to practical forensic problems, the majority of candidates would think it advisable and necessary to acquire some experience in this field. The interest for medicolegal postgraduate instruction would probably become greater than it is at the present time. The European system with its special training of several years' duration in special institutes could be introduced step by step with the assistance of both

universities and public administration. If the medical examiner's system should gradually spread, the need for thorough training would at once become noticeable.

As to the undergraduate training in forensic medicine, I suggest broadening the field beyond what is given in the New York medical colleges. If the curriculum allows, I think it might be advisable to treat the following subjects: identification of the living and examination of the dead, medicolegal relations of death, signs of death, death from asphyxia, death by burning, sunstroke and electricity, death from cold and from starvation, wounds and mechanical injuries, matters involving the sexual functions, including sexual perversions, pregnancy and legitimacy, criminal abortion, birth and infanticide, medical examinations for insurance purposes, medical privileges and obligations, and evidence and procedure as regards the practicing physician.

To cover these subjects 25 to 35 hours would be necessary, without going into forensic toxicology or forensic psychiatry. Whether that will be possible, I do not know. But I am sure that the students would hear many things they should know, because later on they suddenly face questions of this kind in practice. I see in New York the same conditions I had an op-

portunity to observe in Berlin—many problems which are of medicolegal interest but which theoretically belong to other fields, such as obstetrics or psychiatry, are not reviewed because the clinician is usually interested in a different aspect. Furthermore, if a compensation case is demonstrated from a medicolegal point of view, it generally is presented quite differently from what would be apparent to the specialist in internal medicine. Whether different elective courses for small groups, such as courses concerning laboratory methods used in forensic medicine, insurance medicine or other topics, should be arranged, depends largely upon the interest of the students and upon the chief of the forensic department. I am sure that a more intimate acquaintance with medicolegal medicine will automatically be followed by an increasing interest in the methods and material, which, in turn, will lead to a gradual extension of instruction in this special branch and will help to overcome the obstacles and prejudices that still exist.

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## MEDICAL HISTORY

### SIR EDWARD CARSON AND THE CHAPMAN POISONING CASE\*

BY WILLIAM PEARCE COUES, M.D.†

IN all the annals of related crime, no case is more celebrated than the one in which Sir Edward Carson successfully prosecuted the infamous poisoner, Chapman.

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"On the 16th of March, Carson led for the Crown in the indictment of one of the most loathsome and successful murderers in criminal history." He was, the author states, probably the best-known and most mysterious person in the annals of modern crime. The prisoner, he continues, called himself "George Chapman." He

was finally indicted under the name of Severin Klosowsky, a Pole 36 years of age. He was charged with the wilful murder of a girl of 20 years, named Maud Eliza Marsh, who had been living with him as his wife.

Majoribanks states that the leading counsel for the defence tried to have stricken off the record evidence as to the prisoner's past life, which he knew the Crown hoped to use, but the judge held that the Crown evidence was admissible. Carson for the Crown, he continues, was then allowed to testify, unrolling a terrible story concerning the defendant's previous life. He began, we are told, by saying that no murder could be more determined and malicious than poisoning. "Certainly," he said, "no murder can be more demonstrative of the cruelty of the person perpetrating it than that of a man standing by the bedside day after day of the person he professed to love, seeing her suffer torture and gradually sinking away from what he has, by his own hands, administered upon the pretense of treating that person for maladies with which he professed to be ac-

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quanted." Many witnesses from different parts of England, we are told, proved in detail by their testimony the frightful story which Carson revealed.

"On the twenty-second of October, 1902, a comely young woman known as Mrs Chapman and the wife of the well-to-do publican in Union Street, Borough, died shortly before her twentieth birthday. She had for some time been tortured by severe abdominal pains which perplexed Dr James Stoker, her medical attendant. But her husband had nursed her with the greatest care, had given her the choicest liquor in his cellar, and she had everything which sustained her during her illness from his own hands." We are further told that his customers knew that Chapman was something of a doctor, and he often was seen reading medical books in his shop. It was considered very strange that he opened the house the day after his "wife's" death.

The father of the girl, it appeared, insisted on calling in his family physician, Dr Grapel. He suspected foul play and thought that the girl was dying of arsenical poisoning. At the girl's death, he insisted on an inquest. Antimony was found in every organ of the body.

Chapman was arrested. He appealed and, had his past life incidents not been discovered, he might have escaped, but papers were discovered that brought to light his strange history. His real name, Marjoribanks states, was Severin Klosowsky. He says that it was found he was born in Poland in 1865. Evidence gradually developed that a Brighton chemist had done business with him in Hastings. He read a report of the inquest in a newspaper and came to London and told the police what he knew. In April, 1897, he had sold an ounce of tartar emetic to a barber by the name of "Chapman" whom he knew well and whose customer he was. He had appeared to know a great deal about medicine and had been living with a buxom little fair-haired lady. Soon after this, the account continues, he left Hastings and purchased a public house in Bartholomew Square off the City Road. After an agonizing illness there, Mrs Chapman died, her body almost wasted away. The cause of the woman's death was attributed to phthisis. Next, we are told, he "married" his barmaid, Bessie Taylor, and moved to Bishop's Stortford, where she died on February 13, 1901, after prolonged agony. Four doctors were called and all differed as to the diagnosis and the cause of her death, but Stoker, the same physician, who was called in to the case of Maud Eliza Marsh at a later date, gave a death certificate. These facts, the account continues, became known from knowledge obtained in the preliminary inquiries, the bodies were exhumed, antimony being found in each one. It was a curious fact that the bodies were

almost perfectly preserved after long interments. "The face and hands were like those of a person who might have been coffered the day before." For years the bodies had lain preserved in their graves.

Delving and research on the part of the Crown prosecutor elicited the fact that the accused had been a student of surgery in Poland and had practiced in a Polish hospital. He had kept in his possession remarkable certificates as to his skill. After being in the Russian Army he came to England and practiced as a hairdresser's assistant in Whitechapel. We are told that he charmed his clients by his clever conversation and his knowledge of medicine. In 1888 he married a Polish girl named Lucy Badeiski, and two years after that, the account states, he went to Jersey City, U S A. In 1892 he came back to England and lived in the same house with his own wife and a woman named Annie Chapman, whom he made his mistress and from whom he took his English name. We are told that these two women, fortunately for themselves, left him and so survived, the latter after a severe illness. Both, it was stated, gave evidence against him at the trial.

We are told that the defendant's lawyer did not put his client into the witness box. He pleaded not guilty and maintained his innocence to the last. He was found guilty after an eleven minutes' deliberation of the jury, and it was said that Mr Justice Grantham condemned the prisoner to death under his Polish name without the customary adjuration, "May the Lord have mercy on your soul."

After the trial was over, it was found that the prisoner had married a woman in Poland and beheaded her there before coming to England. Mr H L Adam, we are told, epitomized some very interesting evidence in his introduction to his edition of this trial to the effect that justice had at last caught an even greater criminal than George Chapman, *alias* Severin Klosowsky, appeared to be. When Detective-Inspector Godley arrested him, Marjoribanks says, he observed to his colleague, "You've got Jack the Ripper at last." Older American physicians will remember well the vivid accounts of this individual who terrorized Whitechapel and its neighborhood and committed the ghastly murders which were so graphically described in the English press of this time. Marjoribanks' account goes on to state that no man had ever been brought to justice for these crimes but according to him the following remarkable consideration may suggest that the man whom Carson prosecuted to conviction in his only murder trial was none other than Jack the Ripper. First in this consideration, he continues, such mutilations as were found could not have been done by anybody without a knowledge of surgery. Moreover, all these crimes were done in the



universities and public administration. If the medical examiner's system should gradually spread, the need for thorough training would at once become noticeable.

As to the undergraduate training in forensic medicine, I suggest broadening the field beyond what is given in the New York medical colleges. If the curriculum allows, I think it might be advisable to treat the following subjects: identification of the living and examination of the dead, medicolegal relations of death, signs of death, death from asphyxia, death by burning, sunstroke and electricity, death from cold and from starvation, wounds and mechanical injuries, matters involving the sexual functions, including sexual perversions, pregnancy and legitimacy, criminal abortion, birth and infanticide, medical examinations for insurance purposes, medical privileges and obligations, and evidence and procedure as regards the practicing physician.

To cover these subjects 25 to 35 hours would be necessary, without going into forensic toxicology or forensic psychiatry. Whether that will be possible, I do not know. But I am sure that the students would hear many things they should know, because later on they suddenly face questions of this kind in practice. I see in New York the same conditions I had an op-

portunity to observe in Berlin—many problems, which are of medicolegal interest but which theoretically belong to other fields, such as obstetrics or psychiatry, are not reviewed because the clinician is usually interested in a different aspect. Furthermore, if a compensation case is demonstrated from a medicolegal point of view, it generally is presented quite differently from what would be apparent to the specialist in internal medicine. Whether different elective courses for small groups, such as courses concerning laboratory methods used in forensic medicine, insurance medicine or other topics, should be arranged, depends largely upon the interest of the students and upon the chief of the forensic department. I am sure that a more intimate acquaintance with medicolegal medicine will automatically be followed by an increasing interest in the methods and material, which, in turn, will lead to a gradual extension of instruction in this special branch and will help to overcome the obstacles and prejudices that still exist.

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## CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

### CASE 2241

#### PRESENTATION OF CASE

A 47 year old Italian housewife was admitted complaining of pain in the right shoulder

The patient had always been well except for occasional attacks of transient and migratory pain in several of the larger joints. Two months before entry she was awakened from sleep at night by a sharp stabbing pain in the right shoulder which radiated down the right side of the chest. The pain was aggravated by inspiration and movement and prevented her from sleeping for about four hours. It subsided but recurred on the following day and intermittently up to her entrance to the hospital. One month before admission she developed intermittent dull aching pain in the left chest, near the postaxillary line, which varied in intensity. At this time a nonproductive cough occurred about two or three times daily. Two weeks before entry she had an attack of dyspnea which persisted for twenty-four hours and during this she coughed up a small amount of blood-streaked sputum. Subsequently she became orthopneic and a week before admission a thoracentesis was performed. Two ounces of bloody fluid were removed and considerable relief was obtained. An x-ray taken at this time showed a high diaphragm with obliteration of the costophrenic angles by overlying soft tissue. No definite fluid was present. Both lower lung fields were hazy and there were fairly well-defined areas of homogeneous dullness in the medial portions. These were larger on the left side. Hilar shadows were slightly increased and the heart was transverse in position. On the night before entry she had another attack of dyspnea and coughed up several small blood clots and bloody sputum.

Fourteen years ago she had a cholecystectomy and appendectomy performed and nine years later a uterine tumor was removed.

Physical examination showed an acutely distressed, cyanotic, extremely obese woman sitting upright in bed. The skin was cold and clammy and there was profuse perspiration. Oral hygiene was poor and the mucous membranes were

pallid. The trachea appeared to be slightly deviated to the left and examination of the chest showed slightly greater expansion on the left side. The right chest posteriorly and the lower axilla were dull to flat, and tactile fremitus was diminished. In this region distant bronchial breathing, pectoriloquy, and egophony were elicited. The right upper chest anteriorly was hyperresonant. Numerous coarse squeaky râles were audible generally and fine moist râles were heard at both bases posteriorly. The apex impulse of the heart was palpated in the sixth interspace at the anterior axillary line. The heart sounds were of poor quality and there was snapping reduplication of the first sound at the apex.  $P_2$  was greater than  $A_2$ . The blood pressure was 130/70. The abdomen was obese, pendulous and showed three scars of previous operations, two of which contained incisional herniae. The liver extended a handbreadth beneath the costal margin and was quite tender. There was no edema.

The temperature was 98°, the pulse 120. The respirations were 30.

Examination of the urine was negative. The blood showed a red cell count of 4,300,000, with a hemoglobin of 70 per cent. The white cell count was 22,300, 87 per cent polymorphonuclears. A serum protein was 6 grams and the nonprotein nitrogen of the blood 13 milligrams. The vital capacity was 900 cubic centimeters and venous pressure 140 to 150 millimeters of water.

X-ray examination of the chest showed considerable change from the previous film. The entire right chest was homogeneously dense and obscured the outlines of the ribs in the lower portion. The mediastinum was only slightly displaced to the left. The dullness in the left chest was also increased but the upper third of the right lung was visible and appeared clear. The diaphragms were elevated.

On the day of entry an exploring needle was inserted for a distance of 6 centimeters into the seventh and eighth right interspaces 8 centimeters from the vertebral column. No fluid was obtained or resistance encountered. The patient was treated palliatively without any improvement in her general state. She became progressively weaker and died on the fourth hospital day.

#### NOTES ON THE HISTORY

DR. FREDERICK T. LORD: There are certain matters which might well have been amplified in the record, i.e., how long this Italian had been in this country and, in view of the possibility of echinococcus disease if she had been exposed to dogs while herding sheep in Italy, as in all pulmonary problems we would like to know about wheezing and about clubbing of the fingers.

year 1888-1889, and Chapman had come to England in 1888 and had remained there during this period. The Ripper murders were in Whitechapel and its immediate environs. Chapman, he states, was working at a barber shop in Whitechapel at that time. In 1890 Chapman went to New Jersey, U S A, and in the same year after his migration a number of murders of the Whitechapel type were committed in and about Jersey City. In 1892 they stopped. This was the time when Chapman returned to England. In addition, it is found that the description of the man who was "wanted for the Whitechapel murders" could also have been used with effect for the arrest of Chapman.

Can it be, asks Marjoribanks, that Chapman may have led two lives, neither of them virtuous, but both abominable ones of crime contrasting only in the method? It may have been, he goes on to state, that, while Chapman was living in comparative respectability with the first of the "wives" whom he "married" so easily and before he met those whose lives he took with his corroding poisons, he was about in the streets at night with his surgeon's knife concealed under his coat, taking unholy pleasure in hunting down the poor unfortunates for mutilation and murder.

At all events, our author concludes, unlike George Smith, the Bathtub Murderer (who drowned his wives in the bathtub to get their insurance), Chapman's motive, as Carson said, was not gain but lust. He became tired of his victims, and when this happened neither medicine nor the law could help them. His success, we are told, made him arrogant, and if it had not been for this fact the "enemy of woman" might have continued indefinitely his career of crime. His confidence in his own success is less mysterious than the strange fascination which enabled him to capture, and apparently retain, the affections of women who delivered themselves into this Bluebeard's hands. Marjoribanks goes on to say that this remarkable power was also possessed by George Smith and that it may also be observed that each of them used with success exactly the same plan again and again "until arrogance made them careless and brought them to the gallows." He concludes with the following significant sentence, "The man, who calls in the same doctor to provide the death certificate for two women he has successfully poisoned with the same drug, is confident indeed."

#### THE PREVENTION OF CANCER\*

Among the silent and sinister economic leeches which sap the blood of civilization, few do a more thorough and tenacious job than does cancer. All the material which the world needs for the greater prevention of cancer is education and the opportunity to obtain, at a low cost, the professional or medical help for which such education calls. Cancer is a disease that thrives on ignorance and must be fought with knowledge.

Fortunately cancer can be prevented. Some of the preventive measures are the following:

1 The observation of scrupulous *cleanliness* of the skin, the mouth cavity and the genital canal. This means the avoidance of infections or if they occur, the obtaining of medical treatment to cure them.

2 *Moderation* in everything concerning the daily life and habits, especially in the use of tobacco, moderate and slow eating, avoidance of food and drinks that are either too hot or too cold or too irritating, such as alcohol in high concentration.

3 The avoidance of *chronic constipation* and of the consumption of irritating foods, not by using cathartics but by training the bowel to function regularly and by acquiring the habit to devote a daily, regular time to this function.

4 Keeping the body in a *perfect state of health* by regular hours of rest, sleep and exercise. One should sleep regularly eight hours and spend at least several hours daily in the open air with moderate exercise, such as walking, swimming, riding, golfing, tennis, bowling and so forth.

5 The *periodic examination*, that is, a yearly examination of men and women and the examination in women, of the breasts and the genital system especially after pregnancy and labor, and yearly after the thirty-fifth year of life. The preferable day would be one's birthday as this day is not easily forgotten and such an examination is a fine birthday present.

6 The immediate reporting to the family physician of any lump on the body or any sore that does not heal within a week, or any discharge or bleeding from any of the body openings, as the nose, the mouth, the genital or urinary canals and the rectum.

The conscientious family physician will refer the patient to a specialist or clinic for an immediate correct diagnosis after the examination, if he can not make it. Many conditions (probably 95 per cent) will not be cancerous and those that are will be detected and offered the best guarantee of a permanent cure if immediately and adequately treated. Those that are not malignant can be treated without great discomfort and at slight expense and the chronic tissue changes are thereby removed.

\*From *Clinical Medicine and Surgery* December 1935

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It is unfortunate that we do not know the nature of the uterine tumor, whether benign or malignant.

The temperature (looking at chart) was normal on the day of admission, but thereafter about 100° by mouth, the pulse about 140 and the respirations 25 to 30.

With respect to the problem as a whole, I assume that the "transient and migratory pain in several of the larger joints" has no bearing on the present situation. The story is that of a woman of 47 with an abrupt onset of pain in the shoulder and chest. The distribution of the pain and its aggravation during inspiration suggest pleural irritation while its recurrence throughout the course of the disease points to persistence of the pleural involvement. Further information is desirable, however, regarding the site of the pain in the right shoulder. Involvement of the trapezius ridge with associated hyperesthesia and hyperalgesia would suggest referred pain from irritation of the central portion of the diaphragm, but it is on the whole more likely that the pain was due to irritation of the parietal pleura.

The onset suggests a so-called "primary pleurisy" two months ago, but the later occurrence of cough, an attack of dyspnea with bloody sputum and the x-ray findings indicate that the lung is also involved. From the dates on the x-ray films, it is evident that the chest disturbance has progressed within about five weeks to such an extent that the entire right lung field has become homogeneously dense. Though the negative tap on the day of entrance is somewhat against pleural fluid, the x-ray and the physical findings are consistent with pleural fluid. Before attempting to make a diagnosis, it would be desirable to see the x-ray films and perhaps Dr. Holmes will demonstrate them.

#### X-RAY INTERPRETATION

DR. GEORGE W. HOLMES. We have two films, one taken in July and one in September. In this film the diaphragm is high on both sides. There must be something in the abdomen to push the diaphragm up rather than a process in the chest, because you would have to have a well-marked collapse of the lung to cause such an elevation of the diaphragm, and the lungs do not appear to be collapsed. This shadow here to the left of the heart shadow is round with rather sharp borders, not at all unlike a metastatic nodule. I cannot be positive. This also looks like a mass extending out into the lung. Then the whole thing is obscured by the high position of the diaphragm. In September this same area was present and it does not seem to have increased a great deal in size, but we have some evidence now of fluid in the pleural space. The lateral views do not show anything

except possibly this one which shows what appears to be a fluid level. Perhaps it was taken after the tap.

#### DIFFERENTIAL DIAGNOSIS

DR. LORD. There are a number of conditions one should consider here. One ought to think of tuberculosis but there is very little to make this plausible. The progress is very rapid for a tuberculous process. We do not see tuberculous processes with these sharply limited lung shadows, and I should say that tuberculosis might be regarded as very unlikely.

I do not think we can quite so readily dismiss echinococcus disease but the areas of increased density are not typical of echinococcus cysts. The density is too soft and not evenly rounded enough for echinococcus cyst. The course is not that of echinococcus disease. We do not see echinococcus disease so rapidly progressing, so that I think we may dismiss that.

There are other conditions which ought to be mentioned which are the possibility of thrombophlebitis, embolism and infarction. The bloody fluid at the chest tap may be said to be consistent with pleural fluid neighboring a pulmonary infarct. In fact, bloody fluids of this sort are very common. But there is no obvious source of emboli here. We would expect bloody expectoration as an early symptom if she had as large areas of infarction as we see in the film. These lesions are too definite and sharply circumscribed to be typical of infarcts. There is with infarction commonly a discrepancy between the severity of the clinical disturbance and the paucity of x-ray evidence, and I think we may exclude infarction.

There remains as the most plausible explanation a malignant process. I am not certain just what the distribution of this malignant process might be. The liver is very much enlarged. There is no adequate explanation for this. There is no circulatory failure. So I think it is fair to assume that she had malignancy which is in the liver as well as the lung and the pleura. We are in a difficulty with respect to its distribution and if it is malignant disease, is it primary or secondary? Then here is this cloud upon the horizon of a uterine tumor that was removed five years ago the nature of which we do not know. It may have been malignant. I do not think I am justified in attempting to go farther and I would say that the most likely diagnosis is malignant disease and that we cannot decide between a primary and secondary growth or between carcinoma or lymphoblastoma, but, as Dr. Holmes has intimated, these circumscribed nodules, assuming they are in the lung fields, are more like secondary than they are like primary malignancy.

DR. DONALD S. KING. I saw this patient once while she was on the ward. She had been

admitted as a case of cardiac decompensation. She was markedly orthopneic and was in the cardiac bed. Clinically she had pulmonary edema, ascites and edema of the extremities. The differential diagnosis lay between primary cardiac disease and pulmonary malignancy. Dr. Chester Jones who was in charge felt that the original x-ray film showed probably tumors, and I believe that he had made a definite diagnosis of malignancy with which I agreed.

#### CLINICAL DIAGNOSES

Carcinoma of the lung?  
Metastases to the liver  
Hypertensive heart disease

#### DR. FREDERICK T. LORD'S DIAGNOSIS

Malignant disease of the lung, pleura and liver, ? secondary to malignant disease of the uterus

#### ANATOMIC DIAGNOSES

Fibrosarcoma of the right lung with metastases  
Chronic cholecystitis  
Cholelithiasis  
Arteriosclerosis, generalized, aortic and coronary  
Operative scars: Cholecystostomy, appendectomy, and salpingo-oophorectomy

#### PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY: The anatomic findings are rather unusual. We found that the two lower lobes of the right lung were completely replaced by a mass of solid tumor. Incidentally, no pleural fluid was found on either side. The upper lobe on the right was well aerated and the middle and lower lobes completely missing, evidently replaced by this very solid, circumscribed, distinctly lobulated tumor. On section it showed a white, fibrous, slightly whorled surface without any trace of hemorrhage or necrosis. In the left lung we found a single area about 3 centimeters in diameter which was soft and appeared at first to be an abscess. The liver was very much enlarged, very pale yellow, obviously fatty, and showed on its diaphragmatic surface a single tumor nodule less than a centimeter in size. The enlargement of the liver evidently was due to the accumulation of fat, not to a metastatic process. We also found a metastasis in one kidney and one in the spleen also, which is rather unusual.

Histologically the tumor is a fibrosarcoma of varying degrees of differentiation. The main tumor mass in the right lung and also the one in the spleen are made up of very well differentiated fibroblasts. In the necrotic mass in the left lung the tumor looks much more malignant and that is also true of the metastasis in the

liver. In both of these there were a great many multinucleated tumor giant cells.

DR. KING: Is not this the first sarcoma we have had for a long time?

DR. MALLORY: It is the first primary sarcoma of the lung that I have seen, assuming of course that it is primary. The "uterus operation" was evidently an oophorectomy and salpingectomy. We have finally succeeded in checking that and find that a simple pseudomucinous cyst of the ovary was removed along with the corresponding tube which showed only slight salpingitis. The possibility of metastasis from a uterine or ovarian tumor is, therefore, ruled out. The possibility of metastases from some minute, undiscovered primary tumor in the skeletal system cannot be eliminated but seems extremely improbable.

Primary fibrosarcomas of the lung are among the rarest of tumors. In this hospital in over 8,000 autopsies we have never seen one before and have run across only one benign fibroma. Involvement of the lung by direct extension from sarcomas arising in the parietal pleura or in the mediastinum is of course less unusual.

DR. HOLMES: Was there any fluid in the abdomen?

DR. MALLORY: No.

#### CASE 22442

#### PRESENTATION OF CASE

*First Admission.* A 66 year old native businessman entered complaining of left hemiparesis.

Except for occasional dizziness with exertion and periods of sleepiness the patient was well until seven weeks before entry. At this time he developed nausea and became unsteady upon his legs. Shortly afterward he vomited and had to be assisted to bed. He became quite drowsy but spent a restless night. On the following day he was unable to move his left arm and examination later showed paralysis of the entire left side of the body, including the face. The systolic blood pressure was 225. Subsequently a left homonymous hemianopsia became evident but there was no aphasia. Within a few days he was able to move his left leg and the blood pressure was 160/90. Four weeks before entry he became able to move the fingers of his left hand and gradually improved until he was able to walk without assistance. A mild confusion evident at the onset gradually disappeared and there remained only a residual weakness on the left side.

Physical examination showed a well-developed and well-nourished man in no acute discomfort. The retinae showed arteriovenous nicking. Vision was diminished in the left visual field bilaterally. The thyroid isthmus was

palpable but not markedly enlarged. The lungs were clear and the heart normal. The blood pressure was 194/96. The left hand and fingers were swollen and the interphalangeal joints appeared increased in size. There was coarse tremor of the fingers. The grip of the left hand was weak. The left wrist joint was slightly swollen, nontender, and there was no limitation of motion. The deep reflexes were normal but they were slightly more active on the left. The right abdominal reflex was more active than the left. There were no sensory abnormalities, but there was a positive left Babinski sign. The left homonymous hemianopsia persisted.

The temperature, pulse and respirations were normal.

Examination of the urine was negative. A concentration test showed a specific gravity of 1.020. The blood showed a red cell count of 4,820,000, with a hemoglobin of 75 per cent. The white cell count was 9,200, 68 per cent polymorphonuclears. The stools were negative. Hinton test was negative. A phenol-sulphonaphthalein test showed 95 per cent excretion of dye in two hours. The nonprotein nitrogen of the blood was 23 milligrams and a fasting blood sugar was 116 milligrams. An electrocardiogram showed normal rhythm with slight left axis deviation.  $T_1$  and  $T_2$  were upright and  $T_3$  slightly inverted. Q-R-S<sub>3</sub> was bizarre. The chest lead was normal.

X-ray examination of the chest showed moderate left ventricular enlargement and there was extreme tortuosity of the aorta.

The patient's condition remained unchanged and he was discharged on the third day.

#### *Final Admission, two months later*

Following his discharge the patient's hemiparesis continued to improve although the visual impairment was unchanged. The tendency toward sleepiness increased slightly but he led a rather vigorous life. About seven weeks before re-entry he had two profound weak spells, after a hot bath, each lasting about two minutes and occurring within a few minutes of each other. Thereafter there was gradual diminution of physical vitality and mental energy. He developed dull aching pain in the right side of the abdomen extending from the pubis to the costal margin. It occasionally radiated into the left chest and was aggravated by movement. The discomfort became progressively worse and there was concomitant loss of appetite. At the same time he became markedly depressed. A week previous to readmission his liver was found to be large and tender, and several days later he had a temperature of 100.4°. He developed a slight cough productive of a small amount of whitish material. Marked nausea and anorexia appeared but the bowel movements were regular. No abnormal stools were noted.

Physical examination showed the patient to be listless and depressed. There was a marked change since his previous entry and he appeared quite ill. An icteric tint of the skin with some pallor was noted and there was evident weight loss. The heart and lungs were normal. The blood pressure was 190/100. The abdomen was slightly distended and the liver extended 8 centimeters beneath the costal margin. The left arm was still weak and an equivocal left plantar response was elicited.

The temperature was 100°, the pulse 100. The respirations were 20.

Examination of the urine was negative. The blood showed a red cell count of 4,790,000, with a hemoglobin of 80 per cent. The white cell count was 16,700, 84 per cent polymorphonuclears. The stools showed some pallor but contained bile. Only the initial specimen gave a positive guaiac test, six others were negative. The nonprotein nitrogen of the blood was 29 milligrams and the serum protein was 5.7 grams. A van den Bergh gave a biphasic reaction and the qualitative test showed 5.1 milligrams of bilirubin. A blood cholesterol was 124 milligrams.

A plain film of the abdomen showed no abnormal gas shadows. The shadow of the liver was low, sharp, and thin. A Graham test was negative. A gastrointestinal series showed no abnormality of the esophagus or duodenum. The stomach was markedly displaced to the left. The right side of the diaphragm was elevated and showed limitation of motion. The shadow of the liver reached the crest of the ilium. A chest film showed evidence of some pleural reaction at the right base with pressure atelectasis but was otherwise negative.

The patient became progressively weaker and more jaundiced. The symptoms became aggravated, particularly the nausea and anorexia. His temperature fluctuated between 98° and 103° and the pulse between 80 and 120. He died on the fourteenth hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR. WYMAN RICHARDSON. There seems no doubt but that he had a cerebral accident of some sort and because of the rather slow onset one might postulate that it was a cerebral thrombosis. Hemorrhage or thrombosis, as a matter of fact, is a difficult differentiation to make and perhaps not of great value. When I have tried to make it I have usually been wrong.

I think a very interesting thing, and one that is not talked about very much, is the fact that people who carry a high blood pressure and have a cerebral accident usually get a very sharp drop in blood pressure and it may remain normal or at a much lower level than before for a long period of time, sometimes many years, which perhaps explains why a patient with a

hemiplegia may live such a long time without further accident

He had a cerebral accident involving presumably the right capsule of sufficient extent to catch some of the optic fibers

One always looks at the ocular fields with the ophthalmoscope but I, personally, do not get much help in the diagnosis of arteriosclerosis. I can always see changes in the vessels and arteriovenous nicking when I feel sure there is arteriosclerosis present. When I do not feel sure, I do not think the ocular examination helps me very much, except in the presence of definite retinal changes such as hemorrhages and so on

The abdominal reflexes are supposed to be absent in hemiplegia. The abdominal reflex on the side of the lesion was diminished, although that is not always true. I think that abdominal reflexes are difficult to interpret and oftentimes too much emphasis is placed on them

The phenolsulphonephthalein test shows good function. As you probably know, we do the phenol red test on the medical wards on the time basis, the amount of dye excreted in the first fifteen and first thirty minutes being much more important than the amount of dye excreted in two hours

A PHYSICIAN: What do you expect in the first thirty minutes for a normal function?

DR. RICHARDSON: Around 25 per cent

DR. TRACY B. MALLORY: The fractional results were 25 per cent in the first 15 minutes, 0 in the next period, 30 per cent at one hour and 20 per cent more at two hours. So that in the course of two hours there was 75 per cent total excretion

DR. RICHARDSON: That is a very good function. Nothing at the end of thirty minutes probably means he was unable to void when they tried to get the second specimen. They give a good deal of water in order to get the test at these two intervals. That is a good renal function

Here we have a 66 year old man with a cerebral accident which I think was probably hemorrhage in spite of what I said in the first place. I believe it was hemorrhage in the region of the left internal capsule

"About seven weeks before re entry he had two profound weak spells after a hot bath. I believe weakness usually occurs in a hot bath not after the patient gets out. What it means is that the effect of hot water in causing peripheral vasodilatation is enough to cause syncope and that is one of the grave dangers in regard to bathing. His weak spells came after the bath and may have been due to some slight difficulty with cerebral circulation such as many old people have

"There was gradual diminution of physical vi-

talidity and mental energy." I am beginning to wonder again if he may have myxedema

"He developed dull aching pain in the right side of the abdomen extending from the pubis to the costal margin." Here is something definitely different. We will leave the cerebral circulation for the moment and concentrate on this new symptom. He has something in his abdomen. He has a large liver, a cough and loss of appetite, with no evidence of gastrointestinal obstruction. The stools seem to be normal. There is no bleeding. I am going to hazard a guess that it represents some type of malignancy. It may have started in the lung and metastasized to the liver, or it may have started in the abdomen and metastasized to the liver. It might have started in the liver but I do not see any evidence so far as that goes. The presenting symptom was dull aching pain in the right side of the abdomen

There was an icteric tint to the skin. I think we may take it that there was also an icteric tint to the sclerae. That sounds as if someone were hedging

"The liver extended eight centimeters beneath the costal margin." There is no note made in regard to the upper border of dullness, a point that should always be noticed in order to attempt to discover whether the liver is large or small

This x-ray film shows the liver edge at the crest of the ilium. The diaphragm is up. It is round, perhaps a little more domed than usual and I should say a little high

The white cell count is a little high. It is fair to say that you get an increase in the white cell count in malignant disease if there is infection or if there is involvement of the bone marrow and you can get it even without bone marrow involvement. You certainly see it quite consistently when there is widespread involvement of the bone

I do not believe that the question of direct and indirect van den Bergh is of much help. The indirect is supposed to indicate a hemolytic type of jaundice and the direct the obstructive type. That is the interpretation which was originally suggested. I do not think it is true and I believe the reaction is more apt to vary with the intensity of the jaundice, the more intense the jaundice the more likely we are to get the direct reaction

There is no evidence in this film of bronchiogenic carcinoma which as you know may well metastasize to the liver, so I am going to rule the lung out as the primary source of the tumor. The cough can be secondary to the elevation of the diaphragm, due to atelectasis of the right lower lobe, with perhaps some slight infection in it

There is no localizing evidence to go on here

except the fact that he has a big liver, that he has jaundice and gets increasingly jaundiced.

It is conceivable that he has a lesion in the stomach. The gastrointestinal x-ray was negative and every time I try to beat the x-ray I am wrong. Cancers of the gallbladder usually arise in gallbladders that have contained stones for a long time. I do not see anything to say except that he has malignancy involving the liver and in this case he will have died from hepatic failure. Primary carcinomas of the liver are very rare. They usually occur on top of a previous cirrhosis or some process of long standing involving the biliary tract. Just for want of knowing where this should be put, I am going to put it in the liver because I do not see any other evidence. I will say he has primary carcinoma or hepatoma.

#### CLINICAL DIAGNOSES

Malignant disease of the liver, ? of origin  
Arteriosclerosis

#### DR. WYMAN RICHARDSON'S DIAGNOSES

Malignancy of the liver (? primary in the liver)  
Cerebral hemorrhage with old left hemiplegia  
Arteriosclerosis

#### ANATOMIC DIAGNOSES

Carcinoma of the tail of the pancreas with metastases to the liver, and the retroperitoneal lymph nodes  
Ascites  
Pulmonary embolism  
Pulmonary infarct, septic, right lower lobe  
Pulmonary congestion, bilateral  
Pleuritis, acute fibrinous, right  
Jaundice  
Cerebral hemorrhage  
Arteriosclerosis, generalized, moderate cerebral, renal  
Peritonitis, chronic fibrous, focal.  
Polyps of the cecum and the ascending colon

#### PATHOLOGIC DISCUSSION

DR. MALLORY: The chief thing we found at autopsy was malignancy. The liver was very large, weighing 3500 grams, and was studded with coarse nodules, which measured up to 4 centimeters in diameter. It seems surprising that they were never felt in a man who was quite thin, but the liver was always described as smooth. The source of the tumor, as is often the case in these very cryptic cases, was the tail of the pancreas. The head of the pancreas was perfectly negative. There was one other

significant finding for which there is absolutely no lead in the clinical history. He evidently had a septic pulmonary embolus with a consequent septic infarct of the lung. It was well on the way to abscess formation at the time he died. It must have occurred after the x-ray picture was taken.

A PHYSICIAN: Where was it?

DR. MALLORY: It was in the upper portion of the right lower lobe. That is an area that would not be obscured by the heart and I think you can say quite certainly it was not there. It was six centimeters in diameter and a septic infarct of that size could not be missed if it had been present.

The gallbladder was essentially negative, except for cholelithiasis. This man also had multiple polypi of the large bowel that were not picked up by x-ray and evidently had caused no symptoms. They were all benign in character.

When Dr. Cabot used to conduct these exercises he was always very emphatic in asserting that the percentage of correct diagnoses would be very much greater if you could tie all the clinical symptoms into one diagnosis than if you made two diagnoses. There was a considerable degree of truth in that and especially as applied to young individuals. But when you are dealing with individuals seventy years of age and over, it seems to me that that is a much less safe procedure. There often appears to be a tendency for everything to break down at once, like the proverbial one horse shay, and it is very common as the age goes up to find severe arteriosclerosis, one or two different kinds of tumor, pneumonia and perhaps other potentially fatal conditions in one individual. I have seen a man in the nineties die with five separate lethal diseases. I could not be sure which had killed him: tuberculosis, an infarct of the heart, a couple of cancers, or a cerebral accident.

DR. RICHARDSON: There is one point about this question of liver nodules that I would like to mention. It is a thing that often is overemphasized clinically and too much attention paid to it. You do find livers where you can very definitely feel hard nodules. Many times, however, nodules have been felt which were not there, or the converse, no nodules felt when they were there.

A PHYSICIAN: With that in mind and without reference to anything else, if a film of that liver had been taken with a proper exposure for that one thing would it have brought out those nodules in the liver?

DR. MALLORY: It is conceivable, but I think by no means very likely.



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## APPROVING MEDICAL SCHOOLS

THE publishing of the qualifications for approving colleges, universities and medical schools comes as welcome news that the Approving Authority created by the statute of 1936 has begun its work. To one who looks upon the registration of educational institutions as a means of securing progress the requirements as published seem in a number of respects to be rather vague. But apparently the Approving Authority is seeking another way than by attempting to enforce complete uniformity. The emphasis is laid chiefly on the teacher secure a competent teacher as the head of each department give him such assistance as he needs in the way of persons, plant and equipment and he will build up his department. Perhaps this method shows a naïve faith in the teacher but in fact it the teacher is not competent to build up his department, no one else can do it for him the only hope is to secure a competent teacher. No amount of executive or administrative talent on

the part of a president or a dean will take the place of competence in the teacher.

The formulation of the requirements indicates that Massachusetts is not to have unique, peculiarly exalted standards, but merely that what is expected of medical schools by other states will be expected here. It is perhaps worthy of note that three medical schools in Massachusetts have for years been meeting the standards generally accepted throughout the United States, and that the absence of standards set by Massachusetts has had no appreciable effect on the quality of their work.

The letter from Middlesex College to which reference was made recently in the *Journal* in the notes on the meeting of the Council suggests that this institution is seriously beginning to set its house in order. Apparently it has had apprehensions as to the continuance of the censorious attitude which has characterized some members of the Society in the past. It has feared that its efforts toward securing adequate clinical opportunities might be in vain if the Society did not proffer assistance. It may be outside of the province of the Society formally to assist a medical school further if the Society already receives graduates of the school into its membership, but the reception of the letter by the Council should remove all doubts as to the attitude of the Society. "Nihil obstat." There is no possible objection to the activity of any members of the Society in attempting to assist the school or any other school in its efforts to meet the requirements for approval.

The new statute places the responsibility on the Approving Authority, and without its approval of a school no graduate of that school will be admitted to examination for registration as a physician. There is, by the statute a period of probation, namely from the effective date of the act until January 1, 1939, and during this period of probation the schools have an opportunity for giving a demonstration as to whether they are capable of meeting the requirements for approval. During the period of probation all persons interested may put forth effort in improving medical education in the weaker schools without being regarded as advocates of low standards. Teachers and clinical material are available and can be secured if these schools will meet the conditions under which physicians and institutions are, in general, willing to cooperate.

If one judges merely by the number of persons in the United States who desire to study medicine, there is need for perhaps ten more medical schools. But it is important to emphasize the fact that the greater need is for improvement in medical education. There is no demand for an inferior grade of medical schools except by persons who place their own gain above the welfare of the patient. The powers

of the Approving Authority will enable Massachusetts to cooperate with the other states in eliminating low grade medical education. The alternatives for low grade schools now are that they must give a reasonably good medical education, or their graduates will not be permitted to take the examination for registration to practice medicine in Massachusetts.

It is reported that the new statute is regarded by some authorities as, within the limited scope of its provisions, one of the best in the United States. One of its peculiar provisions is the composition of the Approving Authority which consists of the Secretary of the Board of Registration in Medicine, the Commissioner of Public Health, and the Commissioner of Education. The field of its activity is primarily in the province of the Board of Registration in Medicine. The importance of Public Health is recognized by the inclusion of the Commissioner, and the inclusion of the Commissioner of Education recognizes the close relationship between preparation for practice and licensure. Perhaps this introduction of the Department of Education should be regarded as another step in the direction already taken by some states, and as an indication of the lines along which further progress is to be made in working out the difficult problem of just what persons should be licensed to practice medicine.

### THE ARMY MEDICAL LIBRARY

WITH the receipt of the first volume of the fourth series of the *Index-Catalogue*, Surgeon General's Office, United States Army, known as the Army Medical Library, renewed interest is taken in this vast medical project. The *Index-Catalogue* has rightfully been called one of the greatest contributions that America has made to medicine. As a matter of fact, no library of comparative size, of any kind, is so well catalogued as our own Army Medical Library.

For many years this *Catalogue* was carried on with inadequate and often indeterminate monetary support. Part of it was started on some money left over from the Civil War hospital funds. From time to time additional support has been received from Congress. The venture, however, has always been on an unstable financial foundation. Thus, in itself, has resulted in a delay of three years in the publication of the new volume of the *Index-Catalogue*.

All will agree about the value of this work. It should, without any question, be continued. In order to see that this is done, Congress will be asked to appropriate annually an adequate sum of money, not only to see that the *Catalogue* is systematically printed but to add to the current medical books and periodicals for the Army Medical Library. It is hoped that enough funds

will be secured to allow a volume of the *Index-Catalogue* to be issued each year.

The Medical Library Association and other organizations are strongly behind this movement. It is hoped that all physicians who have an interest will aid by expressing their thoughts to the senators and congressmen from their districts.

The Army Medical Library is one hundred years old this year. The collection of books, which now has grown to nearly 400,000 volumes, began in the office of Surgeon General Joseph Lovell in 1836. Appropriate ceremonies to commemorate the anniversary are to be held in Washington on November 16. At the same time plans will be discussed, and perhaps even decided upon, for a new library building.

These two measures, the adequate financial support of the *Index-Catalogue* and the projection of a new Army Medical Library building are both of widespread interest to the medical profession and deserve our earnest support.

### THE PERENNIAL PARADOX

DEATHS exceeded births in France in 1935, according to *La Science et la Vie*, by nearly 20,000. 638,881 infants were born and 658,367 deaths occurred. In 1934 the births exceeded the deaths by about 43,000. Germany, on the other hand, showed an excess of 80,000 births over deaths during 1935. Meanwhile life grows longer, the expectation of life at birth in our own country having increased from 32.77 years in 1880 to 55.77 years in 1930.

Apparently, except under unusual economic circumstances, and then only in certain countries, the dangers of race suicide are more apparent than real, and populations are on the increase. Increasing populations have always been a desideratum of the more clamorous politicians and even statesmen the world over, despite a real anxiety as to the wherewithal to feed, clothe and shelter this excess human baggage. Only in recent years has the world produced enough food for the human inhabitants of its surface, and even then the means of distribution lagged miserably behind the ability to produce. And still the political arbiters of the most densely populated countries have shouted out of one side of their mouths for more souls to save, and out of the other for increased territorial expansion with which to save them.

Other, and more thoughtful economists, in the midst of these dictatorial ululations, warn us that we are rapidly exhausting our natural resources, that our mineral stores are being depleted, our watersheds denuded, our water courses polluted, our wild life exterminated, which, in the case of our feathered denizens, means an appalling increase in insect life, and

our fertile lands, through soil erosion, being converted into possibly perpetual dust bowls

It might seem wise, before congratulating ourselves too fervidly on increasing populations, to place quality before quantity, and plan where by these populations could live more securely comfortably and contentedly on the only sphere so far as we know, which they are likely to inhabit. The present Spanish method of controlling superfluous population, while efficient seems hardly designed to recommend itself to the superfluous individual

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

GOOD, FREDERICK L. M.D. Harvard University Medical School 1904 F.A.C.S. Professor of Obstetrics, Tufts College Medical School. Instructor in Gynecology, Harvard University Medical School. Surgeon-in-Chief, Gynecology and Obstetrics, Boston City Hospital and St. Elizabeth's Hospital. His subject is "Menorrhagia and Metrorrhagia of Benign Origin in Women Under Forty-Five Years of Age, with a Plea for More Conservative Treatment." Page 805. Address 20 Commonwealth Avenue, Boston, Mass.

SCHUMANN, EDWARD A. A.B., M.D. University of Pennsylvania School of Medicine 1901 F.A.C.S. Professor of Obstetrics, University of Pennsylvania School of Medicine. Surgeon-in-Chief, Kensington Hospital for Women. Gynecologist and Obstetrician Philadelphia General Hospital and Memorial Hospital. Obstetrician Chestnut Hill Hospital. Consulting Obstetrician and Gynecologist, Frankford, Jewish Rush and Burlington County Hospitals. His subject is "Observations Upon the Hemorrhage of Pregnancy." Page 811. Address 1814 Spruce Street, Philadelphia, Pennsylvania.

SHIPTON, GEORGE M. A.B., M.D. Johns Hopkins University School of Medicine 1917. Obstetrician, House of Mercy Hospital, Pittsfield, Mass. His subject is "Hospital Puerperal Septicemia." Page 817. Address 74 North Street, Pittsfield, Mass.

LYNCH G. W. A.B., M.D. Harvard University Medical School 1933. Junior Associate in Medicine, Peter Bent Brigham Hospital. Assistant Visiting Physician Long Island Hospital. His subject is "Diabetic Deaths in Boston During 1935." Page 822. Address 520 Commonwealth Avenue, Boston, Mass.

LANDE KURT E. M.S., M.D. University of Berlin, Germany 1925. Formerly, Assistant Medical Examiner, State Institute for Forensic

Medicine Berlin University. Since September 1, 1934, Instructor in Forensic Medicine, New York University College of Medicine. His subject is "Forensic Medicine in Europe—Legal Medicine in America." Page 826. Address 228 East 36th Street Apt 5D, New York City.

COUES, WILLIAM PEARCE M.D. Harvard University Medical School 1894 F.A.C.S. Formerly, Surgeon to Out-Patients, Massachusetts General Hospital. His subject is "Sir Edward Carson and the Chapman Poisoning Case." Page 834. Address 12 Monmouth Court, Brookline, Mass.

### The Massachusetts Medical Society

#### FOURTH ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning November 2

##### Barnstable

Sunday, November 8 at 4 00 p. m., at the Cape Cod Hospital, Hyannis. Subject Heart Disease. Treatment of Cardiovascular Emergencies. Instructor B. E. Hamilton. John I. B. Vail, Chairman.

##### Berkshire

Thursday, November 5, at 4 30 p. m., at the House of Mercy Hospital, Pittsfield. Subject Cancer of the Cervix, Fundus and Ovary. Instructor G. A. Leland, Jr. Melvin H. Walker, Jr., Chairman.

##### Bristol North

Thursday, November 5 at 4 00 p. m., at the Morton Hospital Taunton. Subject Acute Abdominal Emergencies. Instructor E. L. Young, Jr. Arthur R. Crandell, Chairman.

##### Essex South

Tuesday, November 3 at 4 00 p. m. at the Salem Hospital, Salem. Subject Blood Diseases. The Hemoglobin and Red Blood Cells in Relation to Disease. Instructor W. P. Murphy. Walter G. Phippen Chairman.

##### Franklin

Wednesday November 4 at 8 00 p. m., at the Franklin County Public Hospital Greenfield. Subject Anesthesia (a) Drugs in Anesthesia. (b) General Care of Patient in Anesthesia. Instructor Joseph Tartakoff. Halbert G. Stetson Chairman.

##### Hampden

Thursday November 5 at 4 00 p. m., at the Academy of Medicine Professional Building 20 Maple Street Springfield and 8 30 p. m., in the Outpatient Department of the Skin and Syphilis Clinic Holyoke Hospital, Holyoke. Sub-

ject Anesthesia (a) Drugs in Anesthesia  
(b) General Care of Patient in Anesthesia  
Instructor S C Wiggin George L Schadt  
and George D Henderson, Chairmen

#### Hampshire

Wednesday, November 4, at 4 15 p m, in the  
Nurses Home of the Cooley Dickinson Hos-  
pital, Northampton Subject Blood Dis-  
eases The Hemoglobin and Red Blood Cells  
in Relation to Disease Instructor C W  
Heath Robert B Brigham, Chairman

#### Middlesex East

Tuesday, November 3, at 4 00 p m, at the Mel-  
rose Hospital, Melrose Subject Blood Dis-  
eases The Hemoglobin and Red Blood Cells  
in Relation to Disease Instructor G S  
FitzHugh Joseph H Fay, Chairman

#### Middlesex North

Friday November 6, at 7 00 p m, at St Josephs  
Hospital, Meirimack Street, Lowell Sub-  
ject Acute Abdominal Emergencies In-  
structor A W Allen Samuel A Dibbins,  
Chairman

#### Middlesex South

Tuesday, November 3, at 4 00 p m, at the Cam-  
bridge Municipal Hospital, Cambridge Sub-  
ject The Prognosis of Heart Disease In-  
structor P D White Edmund H Robbins,  
Chairman

#### Norfolk

Friday, November 6, at 8 30 p m, at the Norwood  
Hospital, Norwood Subject *Complications*  
of Diabetes and Their Treatment Coma  
Insulin Reactions, Surgery (Gangrene, Car-  
buncle, etc) Marriage and Pregnancy Tu-  
berculosis and Heart Disease Instructor  
Alexander Marble Hugo B C Riemer  
Chairman

#### Worcester (Milford Section)

Thursday, November 5, at 8 30 p m, in the  
Nurses Home of the Milford Hospital, Mil-  
ford Subject Suppurative Lung Disease,  
Lung Abscess and Bronchiectasis Instruc-  
tor F T Lord Joseph Ashkins, Chairman

#### ESSEX SOUTH DISTRICT MEDICAL SOCIETY

##### APPLICANTS FOR EXAMINATION BY CENSORS

Dr Nathan L Jacobson of Lynn, a graduate of  
Maryland Medical College has been recommended  
by the following Fellows as an applicant for the  
Massachusetts Medical Society Dr Worthen of  
Lynn Dr Reingold of Lynn Dr Thomas Hennessey  
of Lynn, Dr Harvey Newhall of Lynn and Dr James  
A Dumas of Lynn

R E STONE, MD Secretary

## MISCELLANY

### HEALTH AND MEDICAL SCIENCE

Plans for a great health center and permanent pub-  
lic museum of health and hygiene for the New  
York World's Fair of 1939 were recently announced  
with the formation of an advisory group represent-  
ing city and national health and medical organiza-  
tions

In making the announcement, Grover Whalen,  
President of the Fair Corporation, said that health  
and medical science will be ranked as one of the  
most important phases of the Fair Plans for the  
necessary buildings and exhibits are yet to be  
worked out, but both the Oberlander Foundation and  
the Carnegie Corporation have already pledged finan-  
cial aid Other giants are expected to provide a  
fund for retaining the exhibits as a nucleus for the  
permanent museum

The committee, of which Dr Louis I Dublin will  
be chairman, will undertake a five fold project in-  
volving the establishment of a permanent museum  
of hygiene such as the famous German institution  
at Dresden

The five major objectives as announced are as  
follows

- 1 A complete coordinated health and medical  
exhibit illustrating for public education the results  
of medical research, which would furnish during the  
Fair a nucleus for a large group of commercial ex-  
hibits of products related to health and afterwards  
the nucleus of a permanent institution

- 2 A model health village constantly demonstrat-  
ing equipment and methods in daily use by individ-  
uals, families and communities

- 3 Emphasis at every appropriate point through-  
out the Fair of protective devices and services in-  
stalled for the benefit of the visitors, which illus-  
trate with commercial advantage the value of each  
device

- 4 Provision for a permanent health center

- 5 A strict censorship of medical products and  
other things sold or promoted on a health basis

The health and medical exhibits will tell simply  
of the relation of the exhibits to the individual, with  
man himself as the central motif In the exhibit,  
it is planned to have representations of the follow-  
ing

'Models of the human embryo in its various  
stages of development

'Formation of habits nutrition and other problems  
of bodily and mental development in the early years  
of life illustrated with common examples which the  
visitor may recognize from his own experience

Protective devices in school and playground dis-  
covery and correction of defects organization of the  
school for health and health teaching posters mod-  
els plays and programs prepared by the children  
themselves, would visually demonstrate the begin-  
ning of participation by the individual himself in  
his own health protection and promotion

Men and women in adult life, their hazards of occupation personal hygiene periodic examinations, accident prevention, responsibilities of parenthood, typical problems illustrated here with moving devices, and mechanical demonstrations will carry along the dramatic story of man's inward struggle to survive and prosper in his modern environment

A considerable section of the exhibit will be devoted to the early recognition of degenerative diseases such as heart disease, cancer, nephritis, and diabetes. The fact that much may be done to prolong the lives of those who suffer from these diseases should alleviate the mental strain and stimulate sufferers to avail themselves of the skill of surgeons, the benefits of x rays and radium, the relief accorded by insulin, and so forth

Dominating this section of man himself and visually summing up the health story of his life may be a life-size man woman and child all transparent (as was the transparent man at the Century of Progress) naturally posed and inwardly illuminated to furnish a brief lesson in gross anatomy and surrounded with working models of the heart, the lungs and other organs

'Why do some people get sick and some stay well?' The question of immunity affects all age groups. A special section of the exhibit may be set aside to deal with this little understood problem. What we know about immunity how it may be acquired naturally and artificially its possibilities and limitations. This story has never been told wholly and understandably to the public. Working models showing the reactions of toxin and antibodies as they are now understood will provide a sympathetic understanding for immunization and vaccination services

Other subjects to be included are the following

Air hygiene and ventilation  
Nutrition and the food supply  
Water purification and sewage disposal  
Municipal cleansing  
Noise—its cause effect and prevention  
Mental hygiene—what it is and how it serves  
Epidemiology and the disease detective  
Protein poisoning—the ragweed and its allies  
The sagas of the Health Heroes of History  
Quacks Quackery Nostrums Fads and Fallacies  
Superstitions—old and new—Relics of the Medicine Man.

#### DR HAROLD A. CHAMBERLAIN ADDRESSES THE CAMBRIDGE MEDICAL IMPROVEMENT SOCIETY

Dr Harold A. Chamberlain, Professor of Urology Tufts College Medical School read a paper October 22 before the Cambridge Medical Improvement Society at the Cambridge City Hospital. Subject: An Evaluation of the Methods Employed for the Relief of Prostatic Obstruction

#### HEALTH OFFICERS' MONTHLY STATEMENT OF VENEREAL DISEASES REPORTED IN THE NEW ENGLAND STATES

AUGUST 1936

This statement is issued monthly for the information of health officers in order to furnish current data as to the prevalence of venereal diseases. The following reports were received from State Health Officers. The figures are preliminary and subject to correction. It is hoped that this will stimulate more complete reporting of these diseases

State	Syphilis		Gonorrhea	
	Cases Re-ported Dur-ing Month	Monthly Case Rates per 10,000 Popu-lation	Cases Re-ported Dur-ing Month	Monthly Case Rates per 10,000 Popu-lation
Connecticut	218	1.27	189	1.10
Maine	30	.36	44	.52
Massachusetts	462	1.06	562	1.28
New Hampshire	5	.10	34	.68
Rhode Island	128	1.88	89	1.31
Vermont	27	.72	38	1.01

*Treasury Department—U S Public Health Service*

#### PHYSICIANS REGISTERED BY EXAMINATIONS HELD JULY 16 1936

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 Frank J Pellegrino, Castleton, Vermont  
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 Albert Davis, Dorchester  
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 Henry W Benjamin, Newton Highlands  
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 William E MacDonald, East Boston  
 Emil H Lewis, East Boston  
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 Jack Meyers, Mattapan  
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 Arnold Mills, Dorchester  
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 Vincent A Balkus, Danvers  
 George E Currier, Sandwich  
 Ruth Kabrisky, New York City

#### MAINE NEWS

The annual clinical meeting of the Maine Medical Association was held at Waterville, Thursday October 15, and Friday, October 16, 1936, with headquarters at the Elmwood Hotel, and a very fine attendance from all parts of the state, more than 150 physicians registering. A meeting of the Council and the County Secretaries and of the Editorial Board of the *Journal* was also held during the session. The clinics at the Maine Central Sanatorium, the Thayer, Sisters and Elm City Hospitals were well attended. Entertainment was furnished for the visiting wives by Mrs Edward H Risley and Mrs F T Hill, wife of the President of the Maine Medical Association this year.

The first evening was devoted to a panel discussion of poliomyelitis conducted by Drs J A. Kolmer Philadelphia Josephine B Neal, New York, W L Aycock, Boston, John L Morse, Boston, and Arthur Legg, Boston.

The second evening was occupied by a discussion of medical economics, participated in by the combined committees of the Maine Medical Association, the Maine Planning Board and the State Department of Health. The survey of conditions in the state has not been completed and will be reported in full at the annual meeting in June, 1937. Information for study by these committees is being sought from doctors, town authorities, public health and tuberculosis nurses and private citizens. It is the feeling so far that the medical needs and conditions in other states are not necessarily the same type as the needs and conditions in Maine, and that a fact finding survey for Maine is necessary before recommendations to fit Maine people and taxpayers can be made.

Certain outstanding facts have been revealed already. First There are a few sections of Maine where because of distance, medical care is available only at prohibitive prices. This condition seems to be at present capable of solution only by bringing the patient to the doctor rather than the doctor to the patient.

Secondly Wherever medical service is available it is of a sufficiently high character to satisfy all emergency and routine care.

Thirdly There is some lack of proper care from want of funds or from indifference on the part of the patient but there has developed no evidence of

criticism that patients fail to obtain essential treatment because of poverty

The committee believes that a solution of the problem can and will be found so that no one in Maine need suffer for lack of medical care without adopting any radical changes

#### NEWTON DOCTOR GIVEN NEW MEDICAL POST

Dr John J Poutas of Newton, Assistant Director of Communicable Diseases in the State Department of Public Health since 1934 has been appointed State Health Officer for the Connecticut River Valley District to succeed the late Dr Harold E Miner of Holyoke

Dr Poutas has been associated with the State Health Department since his graduation from Harvard Medical School in 1930, first as Epidemiologist in the Division of Tuberculosis. He then served a year as intern in the Newton Hospital and, after completing this appointment returned to the Department as Epidemiologist in the Division of Communicable Diseases. In December 1934, he was promoted to the position of Assistant Director of the Division of Communicable Diseases serving in that capacity until his recent appointment.

The new appointee is thirty-one years of age married and has two children. He graduated from Waltham High School and Boston College

#### DR. RUSSELL AWARDED THE SEDGWICK MEMORIAL MEDAL

Dr Frederick F Russell Professor of Preventive Medicine in the Harvard Medical School and Professor of Epidemiology in the Harvard School of Public Health has been awarded the Sedgwick Memorial Medal for distinguished service in public health, the American Public Health Association announced October 20, 1936

This medal, awarded annually by a special committee of the association was created in memory of the late William Thompson Sedgwick, professor in the Massachusetts Institute of Technology and one of the outstanding investigators and teachers in the field of public health

Dr Russell who is the eighth recipient of the medal is a graduate of Columbia University College of Physicians and Surgeons and of the University of Berlin where he did postgraduate work. He rendered distinguished service in the field of public health by demonstrating for the first time the efficacy of vaccine prevention of typhoid fever among the United States troops mobilized along the Mexican Border in 1911 and the subsequent years

In 1920 Dr Russell became director of the public health laboratory service of the International Health Board Rockefeller Foundation and later succeeded to the position of general director of the International Health Board now the International Health Division of the foundation from which he retired in 1935—Abstracted from the *New York Times*

#### TWO BOSTON DOCTORS AWARDED X RAY MEDALS

The gold medal of the American Roentgen Ray Society for the outstanding exhibit of the annual meeting was recently awarded to Dr Aubrey O Hampton and Dr J Maurice Robinson of Boston, in Cleveland

The exhibit was entitled The Lipiodol Demonstration of Rupture of the Intervertebral Disc into the Spinal Canal with Special Reference to Unilateral Lumbar Lesions Accompanied by Low Back Pain with Sciatic Radiation and illustrated a paper by the same title. It presented in detail the roentgen findings in fifty cases operated upon at the Massachusetts General Hospital for the relief of symptoms of spinal cord and nerve root compression caused by the protrusion of portions of the intervertebral disc into the spinal canal a clinically interesting group of cases described by Mixer and Barr and Mixer and Ayer in *The New England Journal of Medicine*, August 2 1934 and August 29, 1935, respectively

The exhibit stressed a method of lipiodol examination which demonstrated a defect corresponding to the lesion in twenty nine of the thirty cases operated upon in the last two and a half years practically all of which were unilateral ruptures of the lumbar discs with the clinical picture of low back strain sacro-iliac disease sciatica or related condition. It illustrated the anatomic basis of the normal lipiodol picture and of the characteristic defects produced by these ruptures and the correlation of these to establish the identity of the individual nerve roots seen in the lipiodol pictures

#### CHARLATANISM

Charlatanism is as old as mankind. If one were to go back to the time of the Greeks he would find descriptions of cults that are not very unlike some of those in vogue today. One of the characteristics of quackery however, is that an individual fad does not last indefinitely. It comes into prominence, soon reaches a peak and then disappears. This also applies to various healing cults, no matter how honestly they may have been conceived.

In this connection it is interesting to read the following quotation from Palmer the leader of chiropractic, which was printed in the September issue of *Colorado Medicine*. Chiropractic is doomed. You have drifted so far from the basic principle of chiropractic that you have lost your identity and brought the basic science bill on your heads. Twenty-eight chiropractic schools have been closed. You cannot defeat the ends of science. The basic science bills are the buckshot which we deserve for trespassing. When chiropractors preach and practice and try to become physicians then it is justifiable for the medical men to educate the chiropractor — *Neighborhood Health, A City Department of Health*

COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1935  
AND SEVEN YEAR AVERAGE

MONTH ENDING OCTOBER 10, 1936

Diseases	1936				Average cases reported for week corresponding to Oct 10 for past seven years	1935			
	Week ending Sept 19	Week ending Sept 26	Week ending Oct 3	Week ending Oct 10		Week ending Sept 21	Week ending Sept 28	Week ending Oct 5	Week ending Oct 12
Amebiasis	—	1	—	1	—	—	—	—	—
Chickenpox	11	8	12	28	23	9	15	16	16
Conjunctivitis Infectious	—	—	—	—	—	1	—	1	—
Diphtheria	—	—	—	2	8	2	3	5	—
Dysentery Bacillary	6	—	1	5	—	18	20	3	—
Encephalitis Epidemic	—	1	—	—	—	—	—	—	—
German Measles	7	4	2	2	2	—	2	5	7
Influenza	2	—	2	—	6	—	3	1	2
Malaria	2	—	—	1	—	1	—	1	—
Measles	3	4	4	6	11	9	9	31	37
Meningococcus Meningitis	—	1	1	—	—	—	—	—	1
Mumps	18	20	11	47	14	2	7	16	11
Paratyphoid Fever	1	8	10	1	—	1	2	—	—
Pneumonia (Broncho)	8	7	14	8	13	7	11	3	8
Pneumonia (Lobar)	4	3	5	17	17	8	9	11	8
Poliomyelitis	—	3	—	1	9	32	33	22	18
Scarlet Fever	3	10	8	19	22	37	13	27	24
Streptococcus Sore Throat	1	2	2	2	1	1	1	—	1
Tetanus	1	—	—	—	—	—	—	1	—
Trichinosis	—	—	1	—	—	—	—	—	—
Tuberculosis (Pul.)	32	26	23	22	21	26	21	40	19
Tuberculosis (O F)	1	—	2	—	1	2	2	1	—
Typhoid Fever	4	1	2	1	4	6	5	2	1
Undulant Fever	2	3	6	1	—	1	1	1	1
Whooping Cough	60	51	36	55	31	36	33	26	16
Gonorrhea	34	23	35	29	30	35	28	59	24
Syphilis	74	17	63	41	40	55	39	70	39

Remarks No cases of Asiatic cholera, glanders, plague or yellow fever during the past seven years

WIND DOES NOT BURN, TESTS IN WIND  
TUNNEL SHOW

Wind alone does not burn the skin. Cases of wind burn, so called are really cases of sunburn in which the wind has helped the sun along by making the skin more susceptible to the ultraviolet rays of the sun. Wind tunnel experiments supporting this belief are reported by Dr W H. Crew of New York University and Dr C H Whittle of Addenbrookes Hospital, Cambridge, England (*Science*, October 2)

In one of the experiments one of the investigators exposed his forearm to the blast of a 40-mile per hour wind in an experimental wind tunnel. The forearm was covered by automobile tire inner tubing except for a small area about one inch square where the rubber was cut away leaving the bare skin exposed to the blast. No ultraviolet light was present to reach the bare skin.

During the half hour exposure to the blast the skin exhibited 'gooseflesh' the report states, "but at no subsequent time was there the slightest evidence of reddening or chapping of the exposed area of the skin."

Cases of wind having caused burning of the skin are due in their opinion to the wind's having made the skin more susceptible to the ultraviolet rays by changing the temperature and moisture of the skin and by suppressing perspiration. Perspiration, they found in other experiments can provide some protection from the actinic rays of sunlight—*Science News Letter*, October 17 1936

DOZEN YEARS ADDED TO AVERAGE LENGTH  
OF LIFE

Eleven years have been added to the average man's life and 12 years to the life of the average



woman it is revealed by the life tables of the U S Bureau of the Census

At the beginning of the present century the average length of life in the United States was 48 years for white men. Now, these new figures give an average life length of 59 years. For women the average lifetime in 1900 was 51 years. Now it is nearly 63 years.

The added years of life are credited to improved sanitation, higher standard of living, labor saving inventions in the homes and the advances made in education and in the science and practice of medicine and surgery.—*Science News Letter*, October 10, 1936

### DIETARY ACIDOSIS

Food charlatans who exploit unscientific systems of dietetics based upon the contention that some foods form excess acid or that various food elements are incompatible were attacked by Dr James A. Tobey, of New York, in an address delivered before the American Public Health Association at the recent annual meeting in New Orleans.

Dr Tobey declared that there is no scientific evidence to indicate that any one food or any combination of foods can significantly alter the acid base balance in a normal individual. He asserted that acidosis is a symptom in certain morbid conditions but the nature of the diet plays no appreciable part in its development.

"Faddists rampant in the realm of pseudo-science have seized upon the acid base balance of the body as an apt subject for their sophistry," Dr Tobey said. "As a consequence much more is written and said on this topic than is known, and much that is so blandly asserted especially for lay consumption is distorted and incoherent."

The acid base balance is a condition in which the ratio of carbonic acid to bicarbonate in the blood is maintained in a definite state of equilibrium. Although alterations in the hydrogen ion concentration of the blood and body fluids may and do occur within certain limits such changes are due to serious disturbances of metabolism or in the functioning of body organs usually the result of severe morbid conditions.

The effects of foods on this acid base balance have been greatly exaggerated for their influence in bringing about modifications in the chemical content of the blood is practically nil.

All foods may of course be classified chemically as acid-forming, base-forming or potentially neutral. By calculating the equivalent in normal acid present in the form of chlorine, phosphorus and sulphur and the normal alkali in terms of the calcium, magnesium, potassium and sodium in particular foods, relative values of excess potential acid or base can be expressed.

Such calculations reveal that foods of decided potential acidity include meats of all kinds, fish, shellfish and eggs, while cereals and breadstuffs show a mild potential acidity. The base-forming

foods include most of the fruits and vegetables with milk and cream displaying a slight potential alkalinity. The citrus fruits contain organic acid radicles, but these are burned in the body so that the end products are potentially alkaline. Pure fats, sugars, starches, and other foods devoid of minerals are neutral in their reactions.

"In the ordinary mixed diet which is the customary fare of the individual who has not succumbed to the wiles of a food fakir, the acid and base-forming elements in the diet will be reasonably well balanced. According to some authorities, however, a slight preponderance of alkaline foods is desirable. The scientific basis for such a categorical recommendation seems nevertheless to be somewhat tenuous."

Dr Tobey reported that recent investigations have shown that there is no significant difference in the acid base picture of the blood of normal individuals when they are fed mixed diets containing excessively alkali-producing foodstuffs.

The accumulation in the body of an excess of acid, or the loss from the body of alkali, occurs as a rule only in certain severe ailments in which there are disturbances of metabolic processes or organic derangements.

True acidosis is a symptom rather than a disease. The word is however a favorite one with food charlatans, who prate of the dire results from certain food combinations. Acidosis is also a popular term with the more gullible of the laity who invariably confuse this condition with gastric hyperacidity or acid stomach.

### CORRESPONDENCE

#### GRANITE DUST CONTROL PROJECT AT QUINCY

The Commonwealth of Massachusetts  
Department of Labor and Industries  
Division of Occupational Hygiene  
23 Joy Street Boston

October 20 1936

Herewith is a copy of a circular letter relative to the Granite Dust Control Project at Quincy which is being sent to the granite manufacturers of the state.

MANFRED BOWDITCH, Director

#### COPY OF LETTER

The Massachusetts Legislature in 1934 instructed the Department of Labor and Industries to make reasonable rules, regulations and orders applicable to all persons engaged in said (granite) industry for the prevention of industrial or occupational diseases therein.

Preparatory to the formulation of such rules, the department undertook, in the fall of 1934, to establish in Quincy with the aid of the U S Emergency Relief Administration an experimental project wherein devices particularly suited to dust control in the small granite shed typical of the industry in

Massachusetts might be developed, installed and tested under actual working conditions. The work of the project, started in March of last year, has now been completed.

The rules and regulations shortly to be promulgated will require the granite employer to provide equipment which will adequately control the hazardous dust incident to granite cutting operations. The purpose of the project has been to secure and make available to the employer information as to the most economical and efficient means for such control. This information will be contained in the report of the project now in preparation for printing. In addition the project will be open for inspection and demonstration of the equipment from 9 a m to 12 m and 1 p m to 3 p m on the following dates: Thursday, October 22, Tuesday, October 27, Thursday, October 29, Thursday, November 5, Tuesday, November 10 and Thursday, November 12.

The enclosed outline indicates the equipment which may be seen at the project, located at the Bizozero granite shed on Bates Avenue, Quincy, Mass. It is hoped that the granite employers of Massachusetts will avail themselves of this opportunity to see and compare the devices available for dust control soon to be required.

Very truly yours,

MANFRED BOWDITCH, *Director*

MASSACHUSETTS DIVISION OF OCCUPATIONAL HYGIENE  
THE GRANITE DUST CONTROL PROJECT

*A Summary Outline*

Project undertaken September, 1934. Work started March, 1935. Completed August, 1936.

Purpose: To determine effectiveness and cost of dust control apparatus applicable to smaller units of granite cutting industry.

Financed by ERA and WPA (labor), insurance companies, tuberculosis associations, granite cutters union and individuals (contingent expense).

Technical supervision by Division of Occupational Hygiene.

EQUIPMENT INSTALLED

Dust Collectors

Ruemelin cloth tube collector—Loaned by Ruemelin Mfg Co.

Pangborn cloth screen collector—Loaned by Pangborn Corp.

Dustube (cloth tube) collector—Loaned by Am Foundry Equipment Co.

Primary collector—Constructed at project.

Flat bag collector—Constructed at project.

Round tube collector—Constructed at project (parts furnished by Harvard School of Public Health).

Furnace cleaning outfit—Loaned by Spencer Turbine Co.

Rotoclone—Loaned by Am Air Filter Co.

Banker Exhaust Equipment

Ruemelin banker exhaust—Loaned by Ruemelin Mfg Co.

Pangborn banker exhaust—Loaned by Pangborn Corp.

Swing pipe banker exhaust—Constructed at project (after plans by C F Berg Co).

Tool attached exhaust—Constructed at project.

Suction brush—Constructed at project.

Flanges, baffle boards, curtains—Constructed at project.

Surface Exhaust Equipment

Swing pipe surfer exhaust—Constructed at project.

Other Equipment

Turntable—Constructed at project.

Dust cart—Loaned by Lansing Co.

Dust can—Constructed at project.

No 4 Monogram exhauster—Loaned by B F Sturtevant Co.

No 22CD exhauster—Loaned by Pangborn Corp.

Motor, 1 H P—Loaned by Pangborn Corp.

Motor, 5 H P—Loaned by General Electric Co.

OTHER DEVELOPMENTS

Calcium chloride as means of laying floor dust. Inter shed dust collection and disposal.

October, 1936

OFFICIAL ACTIONS OF THE BOARD  
OF REGISTRATION IN MEDICINE

State House, Boston

October 22, 1936

Editor, *New England Journal of Medicine*,

At the meeting of the Board of Registration in Medicine held October 8, 1936, it was voted to suspend for three months (from October 8, 1936) the license of Dr Julius Saipé, 218 Highland Avenue, Somerville, Massachusetts for deceit in connection with an accident insurance case.

Yours very truly,

STEPHEN RUSHMORE, M D, *Secretary*

M de CHIRAC AND THE MISSISSIPPI BUBBLE

Editor, *New England Journal of Medicine*,

The following quotation is from *Extraordinary Popular Delusions and the Madness of Crowds*, by Charles Mackay LL D published by L C Page and Company, Boston, 1932.

M de Chirac, a celebrated physician, had bought stock at an unlucky period, and was very anxious to sell out. Stock however, continued to fall for two or three days much to his alarm. His mind was filled with the subject when he was suddenly called upon to attend a lady who imagined herself unwell. He arrived was shown upstairs and felt the lady's pulse. It falls! It falls! Good God it falls continually, said he musingly, while the lady looked up in his face all anxiety for his opinion. 'Oh, M de Chirac she said starting to her feet and ringing the bell for

assistance, 'I am dying' I am dying' It falls' It falls' 'What falls' enquired the doctor in amazement My pulse my pulse' said the lady I must be dying' Calm your apprehensions dear madam said M de Chirac, I was speaking of the stocks The truth is, I hardly know what I have been saving''

Yours truly,

WM PEARCE COUES, M.D

October 22 1936

## RECENT DEATHS

**ANTHONY**—GEORGE CHENERY ANTHONY, M.D. of Denton Road, Wellesley died at his home October 22 1936 Dr Anthony was born in Central Falls R I, in 1878 received his premedical education at Brown University and graduated in medicine from the Boston University School of Medicine in 1904

Dr Anthony was a Fellow of the Massachusetts Medical Society and the American Medical Association and was staff member of the Newton Hospital the Waltham Hospital the Leonard Morse Hospital of Natick and the Union Hospital in Framingham

His specialty was Roentgenology He was a member of the New England Roentgen Ray Society the Harvard Musical Club the Wellesley Lodge of Masons and the Kiwanis Club

His military service was as lieutenant colonel in the 94th Division Medical Reserves Camp Greenleaf, Georgia, and at the general hospital in Raleigh N C with the rank of captain.

Dr Anthony is survived by his widow Mrs Helen C Anthony a daughter Miss Jean Boss Anthony a son, Joseph H Anthony of Brookline two sisters Mrs Charles C Hamilton of Wellesley and Mrs Clarence G Remington of Providence and a brother Frank J Anthony of Providence

**CHANDLER**—HENRY BECKLES CHANDLER M.D. C.M., died October 7 1936 at Arcadia California Dr Chandler was born in Barbados West Indies June 24 1855 the son of Cumberbatch and Catherine E (Gall) Chandler His family left Barbados and went to Montreal when he was ten years old He received his early education from tutors and then went to the University of Bishop College Faculty of Medicine working his way through because of the death of his father Dr Chandler graduated with honors in 1880

From 1880 to 1882 he was House Surgeon at St Peter's Hospital Brooklyn New York. From 1882 to 1883 he was Surgeon at St Elizabeth's Hospital Boston In 1883 he became House Officer at the Massachusetts Eye and Ear Infirmary, where he remained until 1912 as a member of the Staff retiring to become Consulting Surgeon until his death In 1902, he became Professor of Ophthalmology at Tufts College Medical School and held that position for nearly ten years

Dr Chandler was a Fellow of the American Medical Association the Massachusetts Medical Society

a member of the American Ophthalmological Association and the New England Ophthalmological Association.

His contributions included articles to the different ophthalmic journals He was a collaborator of the System of Ophthalmology and the American Encyclopaedia of Ophthalmology

Dr Chandler was credited with the first button hole' operation which took the place of iridectomy in cataract operations leaving the pupil in its natural shape without the danger of a prolapsed iris He did many of these operations with marked success

His private practice was large and covered a period of forty-eight years in Boston. Being kind, jovial and charitable he made a host of friends among his patients and from their contact derived most of his pleasure in the later years

Dr Chandler married Hattie L. Rigby in 1885 They had four children Harold B Chandler, M.D. Mrs George S Fuller of West Newton Massachusetts, and Charles H and F Phillip S Chandler of California. Mrs Chandler died thirteen years after their marriage Dr Chandler practically gave up social life, following her death and spent most of his leisure in reading

Until a few years before he retired at the age of seventy-five he enjoyed excellent health As a younger man he particularly enjoyed fishing

After retiring he went to California to live, but returned to spend his summers in Boston

Three brothers his four children and seven grand children survive him

**CROSS**—WILLIAM P CROSS M.D. of 491 East Broadway, South Boston died October 21, 1936 He was born in South Boston in 1873 and graduated from the Harvard Medical School in 1896 His internship was served at the Carney Hospital

Dr Cross was a member of the South Boston Medical Society, a Fellow of the Massachusetts Medical Society and the American Medical Association and a member of the Pere Marquette Council and Knights of Columbus

Dr Cross who was unmarried, is survived by a sister Miss Catherine F Cross

## OBITUARY

### DR. EDWARD DANIEL HURLEY

Dr Edward Daniel Hurley Surgeon in Chief of the Ophthalmological Service at the Carney Hospital died June 8 1936 He was born in South Boston in 1881 graduated from the Boston Latin School in 1900, and from the Harvard Medical School in 1904 He then trained for his specialty in the Carney Hospital Massachusetts Eye and Ear Infirmary and in Vienna. He was a Fellow of the American College of Surgeons a member of the Academy of Ophthalmology and Oto-Laryngology and was President of the Governing Board of Carney Hospital for many years

Dr Hurley was a former President of the South Boston Medical Society Captain of the Old Ninth

Regiment Medical Corps and a member of the South Boston Citizen's Association. He was affiliated with the Knights of Columbus and the Belmont Country Club.

He is survived by his widow, Isabel, and four children, Edward D. Jr., Paul, Vincent and Dorothy.

We his former associates at the Carney Hospital, deeply mourn his loss and feel that a valiant and true friend has passed on. Wise, kind and just in his counsels, he was ever ready to bear or lighten the burdens of another. He gave freely of his great skill to ease the pain and affliction of his fellow man. He was a true physician, and to be his friend was to know the full meaning of friendship: a clasp of his hand, his smile and gentle voice meant loyalty in all things dear to true friendship.

We men of Carney shall badly miss our physician, friend and counselor.

So long you wandered on the dusty plain,  
Where flit the shadows in their endless cry  
You reach the shore where all the world goes by,  
And leave the strife, the slavery, the pain.

## NOTICES

### MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p. m. on Thursday, November 5 in the Amphitheater of the Peter Bent Brigham Hospital, Dr. James H. Means, Jackson Professor of Clinical Medicine, Harvard Medical School and Chief of Medical Services, Massachusetts General Hospital will give a medical clinic. To it are cordially invited practitioners and medical students.

### HOME OWNERS—WATCH OUT!

Watch Out for This Racket!—Smooth high pressure salesmen urge you to have repairs—shingling, painting and so forth—made on your house upon representations that your house would be used as a display job for advertising purposes and that you would be well paid for permitting its use for display and a commission on other jobs secured as a result.

Complaints indicate that these representations have been used as a fraudulent method of inducing home owners to sign contracts and promissory notes for repairs. The notes are immediately sold to third parties who proceed to collect—but the display job idea is the bunk. You don't collect any commissions or anything else but a lot of debts—*Boston Better Business Bureau*.

### ANNOUNCEMENT

MYER BRODY, M.D., announces the opening of his office at 1478 Highland Avenue, Needham, Massachusetts.

### REMOVAL

AUSTIN W. CHEEVER, M.D., announces the removal of his office from 41 Bay State Road, Boston to 464 Beacon Street, Boston. Telephone, Kenmore 9145.

### BOSTON DISPENSARY

25 Bennet Street, Boston

#### MEDICAL CONFERENCE PROGRAM

Lecture Room, Second Floor

9 10 a. m. November, 1936

Tuesday, November 3—Diseases and Injuries to the Hip Joint. Dr. John D. Adams.

Wednesday, November 4—Hospital Case Presentation. Dr. S. J. Thannhauser.

Thursday, November 5—Blood Clinic. Dr. Isidore Olef, Dr. H. G. Brugsch.

Friday, November 6—Protamine Insulin. Dr. Elliott P. Joslin.

Saturday, November 7—Hospital Case Presentation. Dr. S. J. Thannhauser.

Tuesday, November 10—Some of the Newer Aspects of Cancer. Dr. William Shedden.

Wednesday, November 11—Holiday.

Thursday, November 12—Chest Clinic. Dr. John W. Strieder, Dr. Heinz Magendantz.

Friday, November 13—The Prevention, Control and Treatment of Tuberculosis. Dr. Frederick T. Lord.

Saturday, November 14—Hospital Case Presentation. Dr. S. J. Thannhauser.

Tuesday, November 17—Prognosis in Tuberculosis. Dr. Samuel J. King.

Wednesday, November 18—Hospital Case Presentation. Dr. S. J. Thannhauser.

Thursday, November 19—Social Service Case Presentation. Miss E. C. Canterbury.

Friday, November 20—Psychopathology and Society. Prof. Elton Mayo.

Saturday, November 21—Hospital Case Presentation. Dr. S. J. Thannhauser.

Tuesday, November 24—X-ray Demonstration. Dr. Alice Ettinger.

Wednesday, November 25—Hospital Case Presentation. Dr. S. J. Thannhauser.

Friday, November 27—Subject to be announced. Dr. Robert B. Greenough.

Saturday, November 28—Hospital Case Presentation. Dr. S. J. Thannhauser.

## REPORTS AND NOTICES OF MEETINGS

### BOSTON SOCIETY FOR THE ADVANCEMENT OF GASTROENTEROLOGY

At the Harvard Club on Thursday, September 24, 1936, the Boston Society for the Advancement of Gastroenterology was organized. This Society is affiliated with the National Society for the Advancement of Gastroenterology, of which organization it represents a local chapter. The affiliation affords the Boston Society the advantages accruing from close association with a large national organization possessing important international connections. The affairs of the Boston Society are administered by an executive committee consisting of two elected members and the officers *ex-officio*. The officers elected for

the following year are as follows President, Dr Charles W McClure Vice President, Dr William R. Morrison Secretary Treasurer, Dr Lester R. Whitaker The elected members of the Executive Committee are Dr Henry Baker and Dr Louis F Curran

The objects of the Boston Society are formally portrayed in its constitution as follows

- a. This Society is organized for the purpose of advancing the practice and study of diseases of the digestive tract and the accessory organs of digestion, including those of nutrition
- b. To stimulate and encourage research work in every phase of Gastroenterology
- c. To unite in one organization those duly licensed physicians who are interested in Gastroenterology and the allied subjects in this field of work.
- d. To promote the practical application of all recent advances in the field of Gastroenterology and to help correlate the clinical and experimental work.
- e. To conduct instruction in Gastroenterology and allied subjects and to act as an educational body To conduct meetings in gastroenterological subjects in connection with other medical organizations or independent of them.
- f. To formulate the highest standards and principles for the practice of Gastroenterology
- g. To encourage legislation and public support as related to Gastroenterology
- h. To affiliate the membership with the National Society for the Advancement of Gastroenterology in constituent membership in that organization Such affiliation gives to the Boston Society for the Advancement of Gastroenterology rights for publication in the official journal of the National Society, *The Review of Gastroenterology*, also on the payment of the dues of affiliation a subscription to all the issues of this journal and publications and full rights and privileges of membership in the National Society for the Advancement of Gastroenterology

Two of the main purposes of the Boston Society are to stimulate interest (1) in the relation of gastroenterology to the practice of general medicine and the various specialties and (2) conversely in the relation of the latter fields of medicine to gastroenterology These objectives are such that the Society's membership will be composed largely of physicians and surgeons whose primary interests are outside the specialty of gastroenterology Thus the Society welcomes applications for membership from all members of the Massachusetts Medical Society in good standing The annual dues are five dollars

Meetings will be held from October to May which notices the Society plans to submit to the *Journal* for publication

## NEW ENGLAND SOCIETY OF PSYCHIATRY

The annual Fall Meeting of the New England Society of Psychiatry was held at the Brattleboro Retreat Vermont on October 8, 1936 One hundred and eighty psychiatrists of New England were present. The hours preceding the dinner were given over to the inspection of the hospital and many favorable comments were heard on the type of construction and equipment of the various buildings At one o'clock an excellent dinner was served.

Dr Winfred Overholser, President of the Society conducted a short business meeting during which the following physicians were elected members of the Society Wilfred Bloomberg, M.D., Boston, Mass. Melvin Goodman M.D., Hathorne Mass. Lois E. Taylor, M.D., Hathorne, Mass., and W K Skinner, M.D., Brattleboro, Vermont Eleven names were proposed to be acted on at the next meeting He then called upon Judge Harrie B Chase, Chairman of the Board of Trustees of the Retreat, who welcomed the members his address being in a particularly happy vein

The President then called upon Dr Horace G Ripley superintendent of the institution, who gave a history of the hospital and definition of its purpose Following this, Dr Overholser called on Dr Gregory Zilboorg of New York City, who spoke on The Border Lines of Knowledge in Present Day Psychiatry This was a most interesting and instructive talk, which it is hoped will be published Dr Zilboorg made many references to Dr Oliver Wendell Holmes and, at the conclusion Dr L Vernon Briggs of Boston gave a vote of thanks and referred briefly to the fact that he was probably the only physician present who attended lectures by Dr Holmes

HARLAN L PAINE, M.D., *Secretary*

## GREATER BOSTON MEDICAL SOCIETY

There will be a meeting of the Greater Boston Medical Society on Tuesday, November 10 at the Beth Israel Hospital Auditorium Boston.

### PROGRAM

Effects of Protamine-Zinc Insulin and Other Mixtures of Zinc and Insulin in Diabetes Mellitus By I M Rabinowitch M.D., D.Sc., C.M., F.R.C.P. (Can.) of Montreal. Assistant Professor of Medicine and Lecturer in Pathological Chemistry, McGill University Medical School

H A KONTOFF M.D., *President*,  
D B STEARNS M.D. *Secretary*

## FAULKNER HOSPITAL CLINICAL MEETING

The next meeting will be held on Thursday afternoon November 5 at 5:00 p.m. In addition to the usual clinical pathologic conference Dr Harlan F Newton will talk on The Practical Application of the Recent Advances in Thoracic Surgery

All physicians are invited

MASSACHUSETTS CONFERENCE  
OF SOCIAL WORK

Salle Moderne, Hotel Statler, Boston, 10 00 a m,  
Saturday, November 7, 1936

*Health Developments in Massachusetts  
Under the Social Security Program*

Presiding Officer—Miss Sophie C Nelson, President,  
Massachusetts Central Health Council

Massachusetts Health Program Development"—Dr  
Henry D Chadwick, State Commissioner of Pub  
lic Health

'The Child Hygiene Program"—Dr M Lulse Diez,  
Director, Division of Child Hygiene

'The Program for Crippled Children"—Dr Edward  
G Huber, Assistant Director, Division of Ad  
ministration

## Discussion

This program was arranged by the Massachusetts  
Central Health Council

## WILLIAM HARVEY SOCIETY

The next meeting of the William Harvey Society  
will be held Friday, November 6, in the Auditorium  
of the Beth Israel Hospital, Boston, at 8 00 p m

## PROGRAM

Speaker Dr Allen O Whipple, Professor of Sur  
gery Columbia University

Subject 'Recent Advances in Surgery of the  
Pancreas

Chairman Dr James J Hepburn, Professor of Sur  
gery, Tufts College Medical School

## NEW ENGLAND HEART ASSOCIATION

The first meeting of the season of the New Eng  
land Heart Association will be held in the audi  
torium of the Moseley Memorial Building of the  
Massachusetts General Hospital, Monday, November  
9 1936, at 8 15 p m

## PROGRAM

## 1 Coronary Disease

The Speed of Healing of Myocardial Infarcts  
Drs Jorge Salcedo-Salgar G Kenneth  
Mallory, and Paul D White

A New Record in Longevity after Coronary  
Thrombosis

A Woman 22 Years Old with Myocardial In  
farction Dr Paul D White

Coronary Disease Under the Age of Forty Years  
Dr R E Glendy

2 The Effect of Inhalation of Tobacco Smoke on  
the Electrocardiogram Dr Ashton Graybiel3 The Heart Fifteen to Twenty Years after Severe  
Diphtheria Dr William Paul Thompson.4 Electrocardiograms in Infancy, with Especial  
Reference to Lead 4 Dr R E Glendy5 The Growing Importance of Cardiac Neurons  
Dr Paul D White

All members of the New England Heart Associa  
tion and interested physicians are invited to attend.  
JAMES M FAULKNER, M.D, Secretary

BOSTON SOCIETY FOR THE ADVANCEMENT  
OF GASTROENTEROLOGY

On Tuesday, November 10, at 12 00 m to 1 00  
p m, a clinical meeting will be held at the Boston  
City Hospital, Gastro Intestinal Department in the  
Out Patient Building An interesting group of cases  
will be shown and an informal discussion will be  
held from a medical, surgical and roentgenologic  
point of view Physicians and medical students are  
cordially invited to attend

## HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society  
will be held in the Peter Bent Brigham Hospital Am  
phitheater (Shattuck Street Entrance), Tuesday  
evening, November 10, at 8 15 p m

## PROGRAM

## Presentation of Cases

A Few High Lights in Harvard Medical History  
By Samuel Eliot Morison, Professor of History, Har  
vard University

Medical students and physicians are cordially in  
vited to attend

MARSHALL N FULTON, M.D, Secretary

## A POSTPONED MEETING

The Trudeau Society meeting scheduled for Octo  
ber 29 at the New England Deaconess Hospital has  
been postponed to November 12 The program as  
published in this *Journal*, page 803, October 22, will  
be that for the postponed meeting

## ESSEX SOUTH DISTRICT MEDICAL SOCIETY

Wednesday, November 4, at 5 00 p m  
Beverly Hospital

Clinic at 5 00 p m

Dinner at 7 00 p m

Speaker Dr Thomas B Quigley of the Peter Bent  
Brigham Hospital, Boston

Subject State Medicine in Sweden "

R E STONE, M.D, Secretary

SOCIETY MEETINGS, CONGRESSES  
AND CONFERENCESCALENDAR OF BOSTON DISTRICT FOR THE WEEK  
BEGINNING MONDAY, NOVEMBER 2, 1936

## Tuesday, November 3—

\*9 a m - 10 a m Boston Dispensary 25 Bennet  
Street Boston Diseases and Injuries to the Hip  
Joint Dr John D Adams

## Wednesday, November 4—

\*9 a m - 10 a m Boston Dispensary 25 Bennet  
Street Boston Hospital Case Presentation Dr  
S J Thannhauser

112 m Clinico Pathological Conference Children's  
Hospital Amphitheater

4 p m - 5 p m Surgical Pathological Conference  
Dr Cutler and Dr Wolbach Peter Bent Brigham  
Hospital

Thursday, November 5—

- \*8 30 a. m - 9 30 a m Clinic Surgical Staff of the  
Peter Bent Brigham Hospital at the Peter Bent  
Brigham Hospital
- \*9 a m - 10 a m Boston Dispensary 25 Bennet  
Street Boston Blood Clinic Dr Isidore Olef  
and Dr H. G. Brugsch
- \*3 30 p m Medical Clinic Peter Bent Brigham Hos-  
pital Dr James H. Means
- \*5 p m Faulkner Hospital Clinical Meeting

Friday, November 6—

- \*9 a m - 10 a m Boston Dispensary 25 Bennet  
Street Boston Protamine Insulin. Dr Elliott P  
Joslin
- 8 p m William Harvey Society Auditorium Beth  
Israel Hospital Boston.

Saturday, November 7—

- \*9 a m - 10 a m. Boston Dispensary 25 Bennet  
Street Boston Hospital Case Presentation Dr  
S J Thannhauser
- 10 a m Massachusetts Conference of Social Work  
Salle Moderne Hotel Statler Boston
- \*10 a m - 12 m Staff Rounds at the Peter Bent  
Brigham Hospital. Conducted by Dr Henry A  
Christian

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

October 29—Massachusetts Society of Examining Physi-  
cians Copley-Plaza Hotel Boston 6 30 p m

November 3 28—Boston Dispensary Medical Conference  
Program See page 854

November 5—Medical Clinic at the Peter Bent Brigham  
Hospital See page 854

November 5—Faulkner Hospital Clinical Meeting See  
page 855

November 6—William Harvey Society See page 856

November 7—Health Developments in Massachusetts  
See page 803 Issue of October 22

November 7—Massachusetts Conference of Social Work.  
See page 856

November 9—New England Heart Association See  
page 856

November 10—Boston Society for the Advancement of  
Gastroenterology See page 856

November 10—Harvard Medical Society See page 856

November 10—Greater Boston Medical Society See  
page 855

November 12—Trudeau Society (Postponed Meeting)  
See page 856

November 12—Pentucket Association of Physicians Hot-  
tel Bartlett 95 Main Street Haverhill at 8 30 p m

November 16—One hundredth anniversary of the found-  
ing of the Army Medical Library 7th Street and Inde-  
pendence Avenue S W Washington D C

November 17 20—Southern Medical Association See  
page 803 Issue of October 22

November 24—Massachusetts Society for Mental Hy-  
giene See page 803 Issue of October 22

December 3 5—Annual Conference of the National Soci-  
ety for the Prevention of Blindness Columbus Ohio

March 30 April 2 1937—First International Conference  
on Fever Therapy Postponement notice See page 52  
Issue of July 2

April 21 24 1937—American Society for Experimental  
Pathology See page 1075 Issue of May 21

## DISTRICT MEDICAL SOCIETIES

### ESSEX SOUTH DISTRICT MEDICAL SOCIETY

November 4—See page 856

### FRANKLIN DISTRICT MEDICAL SOCIETY

Will meet at the Weldon in Greenfield at 11 a m the  
second Tuesdays of November January March and May  
Sunderland CHARLES MOLINE M.D. Secretary

### HAMPDEN DISTRICT MEDICAL SOCIETY

November 5—Censors meet for the examination of can-  
didates at the Springfield Academy of Medicine 20 Maple  
Street Springfield 4 p m

### MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

November 18—Bear Hill Golf Club Stoneham  
January 13 1937—Bear Hill Golf Club Stoneham  
March 16, 1937—Danvers State Hospital Danvers  
May 11, 1937—Bear Hill Golf Club Stoneham

KENNETH L. MACLACHLAN M.D. Secretary  
1 Bellevue Avenue Melrose

### NORFOLK DISTRICT MEDICAL SOCIETY

November 5—The Censors will meet for the examina-  
tion of candidates Fee of \$10.00 is payable at the time  
of examination Application blanks may be obtained by  
writing the Secretary furnishing name address and name  
of school of graduation in medicine Candidates whose  
applications are on file will receive proper notices

November 24—8 15 p m The Beth Israel Hospital  
Communications and Case Presentations by the Staff.  
Principal subject—Cardiology Details of program to be  
announced

January 19, 1937—8 15 p m The Peter Bent Brigham  
Hospital. Communications and Case Presentations by the  
Staff Suggested title—Abdominal Pain from the Medi-  
cal and Surgical Standpoint. Details of program to be  
announced.

February 23 1937—Time place and details of program  
to be announced

March 30 1937—8 15 p m New England Deaconess  
Hospital. A Symposium on Diabetes entitled A Survey  
of the Diabetic Work of the George F Baker Clinic  
in the New England Deaconess Hospital Communica-  
tions and Case Presentations by the Staff. Drs Elliott P  
Joslin Howard F Root, Priscilla White Alexander Marble  
and Allen P Joslin

May, 1937—Annual Meeting Details to be announced

FRANK S. CRUICKSHANK M.D. Secretary  
1247 Beacon Street Brookline

### PLYMOUTH DISTRICT MEDICAL SOCIETY

November 19—6 p m Goddard Hospital

January 21 1937—11 a m Bridgewater State Farm

March 18, 1937—11 a m Brockton Hospital.

April 15, 1937—Annual Meeting 11 a m Dux Hos-  
pital

May 20 1937—11 a m Lakeville State Sanatorium

FRED F. WEINER M.D. Secretary  
231 Main Street Brockton

### SUFFOLK DISTRICT MEDICAL SOCIETY

November 5—Censors Meeting Boston Medical Libra-  
ry 8 Fenway 4 p m

November 18 1936—Boston Medical Library 8 15 p m  
Hydrocarbons and Cancer Dr M J Shear—U S  
P H. Service. Cancer Research Recent Advances in  
Our Knowledge of Cancer Dr J C Aub Discussion  
Dr J W Schereschewsky—U S P H. Service and Dr  
R. B. Greenough

January 27 1937—Boston Medical Library 8 15 p m  
Joint Meeting with the Boston Medical Library 'Anthro-  
pology' Dr Carleton S. Coon

March 31 1937—Boston Medical Library 8 15 p m  
Social Insurance—It Affects the Medical Profession  
Dr Charles E. Mongan Discussion Dr Channing Froth-  
ingham

April 28, 1937—Annual Meeting Boston Medical Library  
8 15 p m Problems in Surgical Diagnosis Dr How-  
ard M. Clute.

CONRAD WESSELHOEFT M.D. President  
CHARLES C. LUND M.D. Secretary

### WORCESTER DISTRICT MEDICAL SOCIETY

November 5—At 4 30 in the rooms of the Worcester  
Medical Library Inc at 34 Elm Street Worcester will  
be held the fall Censors meeting

November 18. Note change of date Grafton State  
Hospital North Grafton Mass 6 15 p m Dinner—com-  
plimentary by the hospital. 7 30 p m Business session  
and scientific program

December 9—St. Vincent Hospital Worcester Mass  
6 15 p m Dinner—complimentary by the hospital. 7 30  
p m Business session and scientific program

January 13 1937—Worcester City Hospital Worcester,  
Mass 6 15 p m Dinner—complimentary by the hospital  
7 30 p m Business session and scientific program

February 10, 1937—Worcester State Hospital Worcester  
Mass 6 15 p m Dinner—complimentary by the hospital  
7 30 p m Business session and scientific program

March 10 1937—The Memorial Hospital Worcester  
Mass 6 15 p m Dinner—complimentary by the hospital  
7 30 p m Business session and scientific program

April 14 1937—Worcester Hahnemann Hospital Worces-  
ter Mass 6 15 p m Dinner—complimentary by the  
hospital 7 30 p m Business session and scientific pro-  
gram

May 6 1937—At 4 30 in the rooms of the Worcester  
Medical Library Inc. at 34 Elm Street Worcester will  
be held the spring meeting of the Board of Censors

Wednesday Afternoon and Evening May 12 1937—An-  
nual Meeting Time and place for this meeting will be  
announced in an early spring issue of the Journal

ERWIN C. MILLER M.D. Secretary  
27 Elm Street Worcester

## BOOK REVIEWS

**Microbiology and Pathology for Nurses** Charles F Carter 682 pp St Louis The C V Mosby Company \$3 00

This elementary treatise covers a wide field in its 682 pages. Entirely inadequate for medical students or practitioners, it might well be serviceable as a review compend for the nurse, for whom it is primarily intended. It can be used by the student nurse, however, only when well supplemented by an adequate course of lectures which would serve both for orientation and elaboration on the more important points. In semiencyclopediaic style, there is but little variation in space devoted to important and unimportant topics. Many of the illustrations are good, others are quite unsatisfactory, as in figure 29 one wonders how the rabbit had been kept still, and in figure 30, there is an excellent view of the shelves of chemicals, but only a blur represents the guinea pig which is supposedly the subject of the illustration.

**Diseases of the Nose, Throat and Ear** For Practitioners and Students Edited by A Logan Turner and others Fourth Edition, Revised and Enlarged 473 pp Baltimore William Wood & Company \$6 00

This edition of an already well known book is excellent either as a reference book or as a textbook. It is admirably planned, wide in scope but clear and compact in style. The subject matter is well balanced and the revision of the various sections has been done with care and intelligence. The illustrations and diagrams are very good. On the whole this is one of the best textbooks in this branch of medicine.

**Arthritis and Rheumatic Disease** Maurice F Lautman 177 pp New York and London McGraw Hill Book Company, Inc \$2 00

This book is an attempt to present the subject of rheumatic disease to the doctor, the nurse and the layman. It is supposed to represent up-to-date specific information. It emphasizes the importance of recognizing the potential arthritic, or the person "threatened with arthritis." Unfortunately nowhere in the book is there any mention made as to the basis for this statement—that is the natural life course of the rheumatic patient is ignored. Obviously without a knowledge of the natural course one cannot speak specifically or authoritatively about altering the course of the disease or about recognition of one threatened with arthritis. Many statements are made loosely and the entire presentation appears to be offered as the work of one man.

The chapter headings outline the field the author attempts to cover. He begins with the query "What Is Arthritis?" Chapters on etiology and symptoms follow. Focal infection, diet, mental aspects and treatment are discussed. Under treatment are chap-

ters on rest, diet, massage and exercise, heat, hydrotherapy, vaccine treatment, care of the intestinal tract and climate. The final chapters deal with prevention, the relation of patient to physician, and summary and conclusions.

The book is a "one star" book. It is not recommended to the physician, the nurse or the layman. For the two former other writers have said the same things better. For the last, the book says too much and does not say it convincingly. In other words it is a somewhat mediocre recapitulation of current material.

**Immunology** Noble Pierce Sherwood 608 pp St Louis The C V Mosby Company \$6 00

The book is written as an introductory text primarily for medical students, but the recent work on immunology, especially in the United States is reviewed so exhaustively that it may also serve for reference. The book has many advantages. The presentation is simple and easy to follow and the short clear definitions of the terms and concepts used in immunology will be helpful for the beginner. The modern points of view receive due treatment and the old classical discussions, which have lost their importance, are reduced to appropriate size. To the reviewer this spirit of modern conception is very attractive. However, he feels that the quest for simple definitions and the subdivision of the whole book into short independent paragraphs is overdone and the presentation is not sufficiently systematic. Certain parts of the book are entirely elementary, while other chapters present recent scientific work in a detail far exceeding the needs of a textbook. A better apportionment and arrangement of the material would be necessary to produce a well rounded modern textbook of immunology.

**A Preface to Nervous Disease** Stanley Cobb 173 pp Baltimore William Wood & Company \$2.50

For many years Professor Cobb has taught neuropathology to the second year students at the Harvard Medical School. His lectures have been issued in the form of a synopsis. This book now expands these outlines into a clear cut introduction to diseases of the nervous system. Although short, it is sufficiently full to give the student a clear idea of our knowledge of neuropathology and the more recent advances in this field. Not only the actual histology but the function of the nervous system is stressed, a broad point of view which has the entire sympathy of the reviewer. Much of the work quoted on such subjects as brain tumors, the cerebral circulation and the cerebrospinal fluid has originated in Boston and this work is fully recognized by the author. He has not failed, moreover, to include the important advances elsewhere.

The book will form a useful addition to those introductory texts which are so useful to medical students.



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## OCCUPATIONAL SKIN DISEASE—A PREVENTABLE DISEASE AND A CHALLENGE TO MODERN PREVENTIVE MEDICINE\*

BY C GUY LANE, M D

THE medical books of the ancients depicted various skin diseases, and early in the sixteenth century scabby lesions and ulcerations were mentioned in connection with laborers in metal work and salt mining. About 1700, Ramazzini made the first real contribution to occupational dermatoses by describing with considerable accuracy the skin eruptions of bakers, farmers, washerwomen and many others. In 1775 the first English contribution by Robert Wilson appeared, though Percival Pott had described the cancer of chimney sweepers some time before this work was published. Albert, early in the nineteenth century, contributed the first French article on this subject, while the Germans began their interest in this field about 1840. In this country much attention has been given to the subject in the last forty years, but the menace of occupational skin disease still exists. In spite of the betterment of working conditions in general, the advances in medical knowledge and the increase in research facilities in business and industry, diseases of the skin due to occupational factors continue to appear far too frequently. It is encouraging, however, that there is an increased interest in such conditions by business executives, insurance officials and other groups. Some states have passed laws requiring that occupational disease cases be reported, and the U S Public Health Service, I understand, has detailed one of its officers for a study of this group of cases. Furthermore, a committee from the Section on Dermatology and Syphilology of the American Medical Association has been appointed for the study of these skin conditions. In planning an attack on this menace, there will be need for much teamwork on the part of business executives, safety engineers, labor, the medical profession, the U S Public Health Service, state agencies and so forth.

That these conditions constitute a real menace is shown by numerous statistics of their occurrence. In 1912 Fordyce reported that 2 per cent of all skin cases were occupational in origin. In 1914 Hazen reported 20 per cent in his se-

ries. Since then Knowles has reported 16 per cent, Oppenheim of Vienna, who has made very extensive studies, 20 per cent, Lane 10 per cent and White of England 25 per cent. The latter in addition stated that there were, at that time, 25,000 new cases a year in England. In 1925 the author estimated 50,000 cases a year in this country and it is doubtful if this number has decreased. McConnell stated that 25 per cent of 2,000 laborers in oils and so forth developed skin disorders, and McCord issued figures showing 30 per cent of insect powder factory employees with dermatitis. In England,

TABLE 1  
OHIO  
SUMMARY OF COMPENSABLE CASES OF OCCUPATIONAL  
SKIN DISEASE REPORTED 1928-1934 INCLUSIVE

	Total All Occupational Cases	Dermatitis	Epi- thelioma (skin or eyes), due to carbon, pitch, tar or tarry compounds	Chrome Ulceration	Potassium Cyanide Poisoning	Total Skin Cases
1928	1 127	894	3	6	3	906
1929	1 317	985	2	10	2	999
1930	1 259	884	1	20	—	905
1931	1,217	833	5	16	1	855
1932	1 069	621	1	79	3	704
1933	1 129	726	1	20	5	752
1934	1 415	913	—	43	—	956
Total	8 533	5 856	13	194	14	6,077

after the compensation act was passed, the figures for occupational dermatitis rose from 19 cases in 1908 to 979 cases out of a total of 1,394 industrial disease cases reported in 1927. There is evidence that there has been an increasing number of claims on account of dermatitis contracted by workers since the act was adopted. In this country one large insurance company reports over 1 300 dermatitis claims per year many without disability, but some running the limit of compensation.

In Ohio the figures for 1934 show 1 415 compensable cases of occupational disease, and 956 cases or 67 per cent were disabled by some skin disturbance. Since 1913 there have been

Read before the Greater New York Safety Conference March, 1936 and with changes before the New Haven Medical Society March 1936.

\*Lan C Guy—Chief Dermatological Department Massachusetts General Hospital. For record and address of author see "This Week's Issue" page 549.

17,771 cases reported with a yearly average, since 1921, of 1,100 cases. In the seven years reported in table 1 approximately 6,000 cases of skin disease due to occupation are found.

In Massachusetts the following table (table 2) indicates the figures taken from the annual reports of the State Department of Labor and Industries, Division of Industrial Safety. A total of 3,215 cases of occupational disease has occurred since 1925, with 1,973 cases, or 61 per cent, occupational skin diseases.

TABLE 2  
MASSACHUSETTS

SUMMARY OF COMPENSABLE CASES OF OCCUPATIONAL SKIN DISEASE REPORTED 1925-1935, INCLUSIVE

	Total All Occupational Cases	Dermatitis	Anthrax	Chromic Ulceration	Potassium Cyanide Poisoning	Total Skin Cases
1925	115	8	5	—	—	13
1926	254	71	10	16	—	97
1927	247	89	8	18	—	115
1928	292	135	7	27	5	174
1929	554	345	12	22	5	334
1930	389	223	9	5	—	237
1931	447	284	12	5	—	301
1933	352	249	8	—	—	257
1934	265	182	7	—	—	189
1935	300*	206	—	—	—	206
Total	3,215	1,792	78	93	10	1,973

\*Estimated

In New York, the State Department of Labor reports that for the year 1933 there were 692 cases of occupational disease, and 462, or 66 per cent, were skin conditions.

Very little information is available in regard to the duration of disability, the cost of compensation paid, the wages lost and the medical expenses of these cases. In 390 cases reported in New York City some years ago, the disability was reported as indicated in table 3.

TABLE 3

DURATION OF DISABILITY IN 390 CASES OF OCCUPATIONAL SKIN DISEASE REPORTED IN NEW YORK CITY

38 per cent	lasted 2 weeks to 1 month
21	1 to 3 months
16	3 to 6 months
24	more than 6 months

In the New York Department of Labor report of 1933 are 461 cases of occupational skin disease, with 69 per cent reporting a loss of time from work of at least two weeks. Thirty-one per cent lost over one month and less than

three months of work, and only 3 per cent reported a disability of more than one year. In 1935, 335 cases were reported, with a loss of 5,685 weeks, an average of fifteen weeks' disability.

In forty shoeworkers examined in my office for insurance companies the disability up to the time I examined them totaled four years; the average being five weeks and the longest ninety-six weeks. It is of interest to note that the average duration of the disease before examination was twenty-two weeks and the longest 144 weeks.

Enough figures have been cited to emphasize the menace existing in the industrial world from skin disturbances and their contribution to the unemployment situation—perhaps a mere drop in the bucket today, but at least worthy of our serious consideration, especially from the standpoint of prevention.

It is well to call attention to certain facts which indicate the possibilities of prolonged disability in these cases. (1) We know that one attack of dermatitis, the appearance of keloids, malignancy and so forth may cause permanent disability in the same way as a broken or amputated leg or lead poisoning. (2) We also realize that one attack may leave the skin more susceptible to irritation from other sources, that is, other chemicals, heat, friction or physical exertion. (3) We are also aware of the fact that the repetition of attacks increases to a marked degree the probability of permanent disability. (4) We know that certain existing skin diseases may be exaggerated by an occupational factor with ensuing disability and that some states consider such cases occupational. (5) I believe that a fungus infection may develop as a complication of an occupational dermatitis, in the same way that a pus infection may complicate an industrial injury, and may prolong the disability to a marked extent. (6) We also know that wrong treatment, stimulating or irritating treatment, will increase the discomfort and prolong the disability in numerous cases to a great degree.

#### CAUSES

What about the causes of skin disturbances due to occupation? Oppenheim of Vienna has formed a comprehensive classification of causes and results produced on the skin, but it is rather complicated. It can be said, however, that the individual causes are literally innumerable. They may be physical, chemical or infectious (table 4).

The physical causes include those of mechanical origin, from friction, pressure, traction and so forth, those of thermal origin from heat or cold, and those of actinic origin, from sun rays or radium. The chemical causes represent the largest group. These agents have been classi-

fied in various ways Suffice it to say that the majority of cases are caused by coal tar derivatives, alkalis, acids and the agents contained in woods and plants The infectious causes include bacteria, animal parasites and fungi

Of special interest is the fact that eruptions on the skin, if not actually caused by, are at least often exaggerated by various cleansing agents, that is, agents used to remove substances employed in work These include, in the first place, water and, secondly, alkalis (the stronger

tecurrent diseases and focal infections contributed to the occurrence of occupational cases Stokes has made the observations that these same factors increase the possibility of dermatitis in individuals under treatment with arspenamine

#### SENSITIZATION

There is not only the physical difference in skins in the way of color, thickness, amount of oil and so forth, but we know that the skins of various individuals have or may develop a varied capacity for reaction to both internal and external agents An abnormal or increased capacity for reaction is spoken of as sensitization, idiosyncrasy, hypersensitiveness or allergy Such a sensitization to a particular substance is the explanation for numerous cases of dermatitis, asthma and hay-fever arising in ordinary life The same condition holds true in industrial cases, but whether industry should bear the whole burden is a difficult question to decide We know that only an infinitesimal amount of a substance may be necessary to cause severe reactions This very minute amount of substance necessary to sensitize an individual renders it almost impossible to solve the problem of whether a hypersensitiveness is acquired or hereditary We know that no substance is supposedly innocuous enough to be beyond suspicion, whether protein or not Therefore, a case may require a most painstaking investigation, perhaps even then without results Sulzberger and others have emphasized the fact that this sensitization may occur in different layers of the skin Thus, different forms of tests are needed for differentiation, namely, scratch tests, intradermal tests and patch tests The latter have proved to be of most value in the occupational dermatoses We know that much care must be used in making these tests and in their interpretation There are many pitfalls, such as the exaggeration of disease process by the test, the localized sensitivity of the hands and arms, the inclusion in the tests of some minute amount of a foreign substance, a possible latent period of seven to ten days and the effect of locality, diet, season and so forth, as reported by Sulzberger and others when tests are performed under apparently identical conditions on animals in different countries

In this connection I have been interested in a recent report of the skin tests made in a series of 432 cases of occupational skin disease In persons working in bakeries, 38 per cent gave positive tests to rye extract, while in the other industries only 4 or 5 per cent gave positive reactions All of these latter individuals gave evidence of clinical sensitiveness, but in the bakery group the majority did not show any clinical manifestations The authors conclude

TABLE 4

#### CAUSES OF OCCUPATIONAL DERMATOSES

##### I Physical

- 1 Mechanical  
Friction pressure traction, etc
- 2 Thermal  
Heat  
Cold
- 3 Actinic  
Sun  
X ray  
Radium

##### II Chemical

- 1 Oxidizing agents
- 2 Reducing agents etc

##### III Infectious

- 1 Bacteria
- 2 Fungi
- 3 Animal parasites

the quicker), such as soda and soda ash, lye, bleaching powders, strong soaps and quick cleaners of various kinds, which dissolve keratin in the horny layer and macerate the skin In these chemical detergents tri-sodium phosphate has frequently replaced caustic as an inexpensive cleaning agent for metal parts, floors and so forth It is in some cases intensified by the addition of caustic soda and may be used in powder form or mixed with powdered soap and abrasive material, such as finely divided lava, quartz or feldspar The third group includes degreasing agents, such as naphtha, gasoline, acetone, turpentine, alcohol and its substitutes, which dissolve out the natural oil in the skin Trichlorethylene, a known industrial poison, is largely replacing gasoline and kerosene as a cleansing agent and is found in numerous trade named mixtures The last group consists of oils or paraffin as used to remove greasy substances No complete list of individual causes has ever been made, but a report of skin irritants was published in 1929 by a committee of the Industrial Hygiene Section, established for this purpose by the American Public Health Association

The very dry skin, the blond skin and the skin very sensitive to light are in general more sensitive to external factors Gardiner of England found that previous skin disturbances, in

that there is a large group who react positively to skin tests but who do not exhibit any clinical manifestations. The patch test is still the only indicated method for investigation of dermatitis of this type and is a valuable aid in many cases.

#### OCCUPATIONS

The occupations affected will vary in different localities, according to the prevailing industry of the particular region. In Massachusetts, in the last five years in which the figures are available, the occupations are ranked in order of frequency as shown in table 5.

TABLE 5  
MASSACHUSETTS—OCCUPATIONS AFFECTED

Occupation	Order of Frequency Affected				
	1927	1928	1929	1933	1934
Tanneries	1	1	3	3	1
Textiles	3	2	1	1	2
Shoes	2	7	2	2	3
Rubber goods	7	4	4	4	4
Printers and publishers	—	—	8	—	5
Food	—	—	6	6	6
Electric manufacturing	—	—	7	7	7
Chemicals	8	8	10	—	8
Machinery etc	6	3	—	5	9
Gas and oil	—	—	—	8	10
Metal trades	5	6	—	9	11

In a large series of cases, 1,342, the more frequent occupations are indicated in table 6.

TABLE 6  
OCCUPATIONS WITH GREATEST FREQUENCY OF INDUSTRIAL SKIN DISEASE

Occupation	Number of Cases of Dermatoses
Housework and allied work	702
Laborers	107
Painters	87
Metal workers	73
Mill workers	68
Oil and grease workers	67
Physicians, dentists and nurses	57
Cloth handlers and tailors	49
Bakers	48
Tannery and leather workers	44
Chemical workers and drug workers	40

#### MANIFESTATIONS

The manifestations on the skin produced by occupational factors are varied. White of Boston has listed forty different diseases of the skin which can possibly be caused by occupational factors. The largest group by far includes dermatitis and eczema. A partial list of the diseases caused by occupation is contained in table 7.

These diseases are not necessarily occupational, some of them are very rarely occupa-

tional. It is to be remembered that an occupational factor may cause these conditions.

#### DIAGNOSIS

Some skin diseases, of course, have no relationship to the work of the individual, and it is, therefore, of considerable importance that an accurate diagnosis of the skin condition be made. There are, not infrequently, coincidences between the onset of skin abnormalities and the beginning of a job or the introduction of a new process, and care must be taken to identify the

TABLE 7  
THE MORE FREQUENT MANIFESTATIONS OF SKIN DISEASE DUE TO OCCUPATION

Acne	Infections
Burns	Actinomycosis
Calluses	Anthrax
Chilblains	Blastomycosis
Dermatitis, acute	Erysipeloid
Dermatitis chronic	Impetigo
Eczema	Paronychia
Epithelioma	Pus infections
Folliculitis	Syphilis
Keloids	Tinea
Keratosis	Tuberculosis
Radiodermatitis	
Ulcers	

manifestations occurring in an applicant for compensation. The worker is prone to reason from the effect seen on his skin back to a causal factor in his work, but many cases have proved that not every skin disease in a worker is of occupational origin. An eruption on the hands of a shoe worker is not always due to the agents he is handling, nor is the novocaine necessarily at fault in the dentist with manifestations on his hands. Other skin diseases may localize on the hands and arms. An early examination by a physician familiar with skin conditions, especially in uncertain cases, can conceivably exclude numerous cases which would otherwise obtain an industrial rating. Not only is a careful inspection and examination of the patient a necessity but, of almost equal value, is an accurate history, not alone of the onset and progress of the disease, but of the work and substances handled. A diagnosis should include not only the name of the disease, but, where possible, the exact cause in each particular case. I am well aware of the difficulty in making a positive diagnosis in a given case. Frequently one must make a diagnosis and qualify it with the phrase "probably industrial" or "possibly industrial." The criteria for these diagnoses are contained in table 8.

As I have just said, it is not always possible to make a positive diagnosis of industrial disease. There is often a language difficulty. The case is often seen and examined long after the original onset, with changes due to time and to

treatment by self or others or with alterations in the history from lapse of time and the unconscious emphasis on suggestions of kind friends. There is often lack of knowledge on the part of the patient of the exact substances and nature of the process, and often, I am sorry to say, a disinterestedness on the part of the factory or shop executives. There is frequently the desire of the employee to obtain compensation, often without regard to facts. There are many borderline cases even without the difficulties above mentioned.

from treatment. Among industrial cases butenyl peroxide, iodine ammoniated mercury, sulfonaphthol and so forth are the most frequent offenders. Such exacerbations may prolong the disability materially so that a warning should be issued to patients to omit agents which aggravate conditions of the skin.

PREVENTION

Our preventive measures should be directed into three channels: first, toward the prevention of disease, by education by cleanliness by

TABLE 8  
CRITERIA FOR DIAGNOSIS OF OCCUPATIONAL SKIN DISEASE

Definite	Probable	Possible	Negative
<i>History</i>			
Exposure or injury	Relation less clear cut	Discrepancies in story	Definite evidence of other skin disease
Attacks—on exposure	Substances less often cause irritation	Substances seldom irritate	
Amelioration—on stopping work			
No outside source of irritation		Other possible irritant	Definite relation to outside irritant
<i>Examination</i>			
Lesions consistent with exposure	Lesions less characteristic	Lesions more indefinite	
Location—consistent	Exam late	Other possible diagnosis	
No evidence of other skin disease	Condition nearly well		

TREATMENT

I shall not discuss the treatment of these cases in detail. I do wish to emphasize certain general principles.

Early detection is an essential of satisfactory treatment so the case should be examined early. The correct diagnosis is necessary. The cause or causes should be detected and eliminated. Then the case can be treated as any other case of the same disease in the same stage would be treated. There is no specific local treatment of an industrial dermatosis. Such a program if it can be carried out consistently will definitely shorten the period of disability.

As a part of therapy, the physician should suggest not only the local treatment but the necessary protective measures possibly a change in the industrial process, a temporary change of work or even a temporary stopping of work before advising the employee to give up his job permanently.

It may not be amiss to stress the desirability of not exaggerating the cutaneous process by treatment. Some years ago I found that 20 per cent of a series of cases of dermatitis were caused by therapeutic agents and numerous industrial cases are seen which are undoubtedly worse

systematic inspection to enforce the standards adopted and by selection of proper employees, secondly toward the prevention of prolonged disability by early detection, the determination of the cause and its removal and proper treatment, and thirdly toward the prevention of false claims that is the compensation of employees with nonindustrial diseases. This requires an accurate diagnosis of the disease and also the detection of malingerers, those who are seeking deliberately to obtain compensation not due them. This latter is a difficult task and may require the aid of a psychiatrist.

As a part of the program of carrying out these measures there should be in the first place in every organization some one individual or committee familiar with the effects on the skin of agents used in that particular industry. This person or group will vary with the size and character of the industry possibly an old employee, a foreman, an executive, a safety engineer, a nurse, a physician or a group who can advise regarding the handling of the agents in question. Secondly there should be a system which will insure as far as possible the early detection of cases and thus the prevention of long disability. The need of an employee reporting to the dispensary, or at least to a re-

sponsible foreman, at the onset of any new development on the skin should be emphasized.

The instruction of employees in the proper use of materials should take place and the employment of adequate safeguards in the handling of potentially irritating agents should be carried out and enforced. Adequate dispensary facilities with a keen, well-trained graduate nurse in attendance and with a physician of the proper type, on call at least if not on regular hours of duty, are invaluable in recognizing these cases early. A healthy suspicion regarding industrial factors should be created in the minds of these individuals, and, if the diagnosis is uncertain, a reliable consultant should be available for settling the question while the picture on the skin is unchanged and while the facts in the particular case are easily accessible and not distorted by time and discussion. Any procedure which enables these cases to be seen by the consulting dermatologist, either of the organization concerned or of the insurance company, will pay dividends, as a rule, in preventing many of the protracted cases that are now seen and in obviating many of the uncertainties of exact origin which arise as time elapses.

The various methods of prevention are many and vary with each special industry. They may be mechanical or chemical. Take, for example, the machine processes in which a cutting oil is used. This work has been very carefully studied and, if the following suggestions are adopted, the major part of disturbances from cutting oils will be eliminated.

(1) Use oils which are nonirritating and free from bacteria, if possible.

(2) Make systematic bacteriologic check-ups to determine the condition of the oils.

(3) Filter and sterilize oils that are used repeatedly.

(4) Give careful attention to the selection of men and avoid placing persons susceptible to infection in departments where oil is handled.

(5) Remove all infected men from oil and from fellow workers.

(6) Pay special attention to the manner in which the men wash.

(7) See that all minor injuries, irritations and infections of every type are reported at once to the plant hospital or to the plant physician for treatment.

Some of the more common general preventive measures are given in table 9.

Protective hand creams of various compositions are employed with varying success. They are often of great value if the employee cooperates in their proper use.

In the accomplishment of an adequate attack on this menace of occupational skin disease, it is necessary not only to develop diagnosis and prevention along the lines already suggested, but

it is imperative that a more systematic, comprehensive and coordinated program be planned in order to achieve more definite results. The establishment of some centralized agency with the purpose of accumulating data about such diseases and aiding in the development of preventive measures would help. Such an organization would do much toward the crystallizing of sentiment on the part of industrial executives.

TABLE 9

## GENERAL PREVENTIVE MEASURES AGAINST OCCUPATIONAL SKIN DISEASES

- 1 Abundant facilities for washing purposes
- 2 Inspection by experienced observers of hands and arms of workers in known irritating agents to enforce—
  - a Cleanliness
  - b Proper use of preventive measures.
  - c Early treatment
- 3 Emphasis on use of rubber gloves, pants aprons and so forth or on proper method of mechanical handling of irritant substances
- 4 Complete removal from skin, by harmless methods of irritants several times per shift.
- 5 Prevention of maceration of skin by liquids, sweat and so forth
- 6 Prevention of dust and irritation therefrom
- 7 Use of oily substances before and after work, especially on workers in degreasing agents
- 8 Care to prevent the use of agents for protection in which a poisonous substance can be dissolved or through which it penetrates
- 9 Prevention of workers with pus infection from entering work or from using towels, and so forth of other workers especially those working with poisonous substances
- 10 Extreme care in use of agents to remove substances from skin
- 11 Selection of resistant employees in occupations where substances are apt to irritate
- 12 Detailed study of occupation with object of devising preventive measures
- 13 Inspection of new employees and those returning from sickness and accidents
- 14 Instructions to foremen concerning early reporting for early treatment

labor, the medical profession and the laity toward occupational disease, in general, as preventable conditions.

It is possible that sectional centers, similar to corps areas in the army, for registration and investigation of possible industrial cases would suffice.

It is possible that the expansion of state programs, following the plans already in use in New York, Ohio, Massachusetts, New Jersey and other states, would work effectively.

It is possible that the U. S. Public Health Service with its awakened interest in occupational diseases may serve as a coordinating agency in the progress toward the elimination, or at least reduction, of such cases. This or

ganization has the advantage of a widespread well-organized medical personnel, with the public health aspects at heart, and could well be, in my opinion, an important factor in any method of attack on the problem. Whether further government participation in business activities is desirable is to be considered.

It is possible that a separate organization with representatives of business executives, dermatologists, industrial physicians, the U S Public Health Service and insurance agencies could accomplish much. I doubt if the measure of success achieved by the American Tuberculosis Association in its attack on tuberculosis can be attained but I should expect a very definite improvement over the present situation. The disadvantages of a new organization are evident. A combination of these methods may be necessary.

As one of the medical contributions to the solution of the problem of occupational skin disease, it will be necessary to provide adequate training in this field in medical schools and in institutions with large skin clinics. Not only should there be courses provided for public health workers, but industrial physicians should have a proper opportunity of reviewing the knowledge of skin affections occurring in industry. A wider dissemination of the facts about these conditions is urgently needed.

Furthermore, investigative work on the subject should be stimulated. Scholarships or fellowships could well be provided by industry, either a single large corporation or a group of

similar trades, for the study of particular problems in this field. Such a fellowship would require a survey of the literature on that particular phase, the obtaining of cases and case histories, the visitation to plants with interviews with workmen foremen, chemists and so forth, a detailed analysis of data obtained and possibly chemical or other laboratory studies in order to render an adequate service. Such studies would undoubtedly emphasize the need for further studies of fundamental physiologic activities of the skin about which so much is lacking at the present time.

#### CONCLUSION

In closing, let me emphasize the need for cooperative efforts all along the line to make real progress toward a definite reduction in these cases in number and length of disability—cooperation in obtaining these cases earlier, cooperation in the employment of demonstrated preventive measures, cooperation in providing for adequate medical training in this field in order to assure accurate diagnoses and cooperation in the detailed studies of cases and industrial processes and in the fundamental physiology or chemistry of the skin. Such a cooperative effort would have the purpose of lessening the burden of this menace for both the employer and the worker. I believe with Dr Hayhuist, consultant in occupational diseases in Ohio, that attention to predisease conditions and to every possible industrial hazard would suffice to prevent occupational diseases or at least a large portion of the disability produced by them.

## THE EFFECT OF PROTAMINE INSULINATE ON THE BLOOD SUGAR LEVEL INCLUDING INTRAVENOUS USE IN RABBITS\*

BY HARRY BLOTNER, M D †

**H**AGEDORN, Jensen, Krarup and Wodstrup<sup>1</sup> have prepared a protamine insulinate, a new insulin, which is said to be absorbed slowly and which appears to have an effect on the blood sugar level over a much longer period of time than does ordinary insulin. Their results with protamine insulinate appear striking and warrant further investigation. The protamine insulinate used in this study was supplied by Eli Lilly and Company. It has been prepared for use in the way recommended by them.

#### EFFECT OF SINGLE DOSES ON BLOOD SUGAR LEVEL

It has been shown that the action of protamine insulinate is milder and more prolonged than that of ordinary insulin. However, it has been

difficult to determine accurately the duration of the effect of protamine insulinate as compared with that of regular insulin. Nevertheless, the blood sugar lowering effect of the former is said to last approximately twice as long as that of the latter.

A comparison has been made of the relative effect of various doses of the new and old insulin on the blood sugar level in rabbits and in normal and diabetic individuals. The blood sugar was determined according to Folin's micro method.<sup>2</sup> Rabbits weighing about five pounds were injected subcutaneously on one day with a given dose of protamine insulinate and on another day with the same number of units of regular insulin. The blood sugar curves were obtained by hourly blood sugar determinations for from seven to ten hours. Similar tests were made in normal and diabetic people who were

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injected after an overnight fast. No food was taken during the test periods.

After the injection of 5 units of regular insulin into two rabbits the blood sugar concentration dropped rapidly from 104 mg to 50 mg in two and three hours and the animals developed convulsions. In comparison, with 5 units of protamine insulinate the blood sugar concentration decreased gradually over a period of four hours to only 75 mg and then it returned to near the original level in about seven hours. In order to get a considerable effect on the blood sugar level within a period of seven to ten hours it was necessary to use comparatively large amounts of new insulin. Consequently, in subsequent experiments with rabbits larger doses were employed.

After the injection of 20 units of regular insulin into seven rabbits, there was a sharp and rapid drop in the blood sugar level and all the animals developed convulsions in about three hours. In contrast, after the administration of 20 units of protamine insulinate there was a gradual and slow decrease in the blood sugar concentration during the test period. Certain rabbits developed convulsions in nine hours after the injection, although this was not a general rule. Illustrations of the results obtained with various doses are given in chart 1.

gradually and a hypoglycemic level was reached in seven hours. In a third person the new insulin caused no decrease in the blood sugar. In contrast, the drop in the blood sugar level after the injection of regular insulin was more rapid as shown in chart 2.

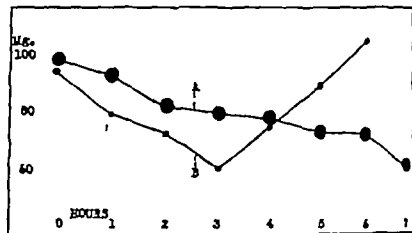


CHART 2 Blood sugar curves following the injection of (A) 10 units of protamine insulinate and of (B) 10 units of regular insulin into a normal woman.

In two diabetic patients the injection of 10 and 20 units of protamine insulinate caused a gradual decrease in the blood sugar level in contrast to the relatively sudden and greater drop produced by regular insulin. An illustration of the results obtained is given in chart 3. The comparative effects of the two drugs appear more striking in diabetics than in normal persons, probably due to the more labile blood sugar seen in the former.

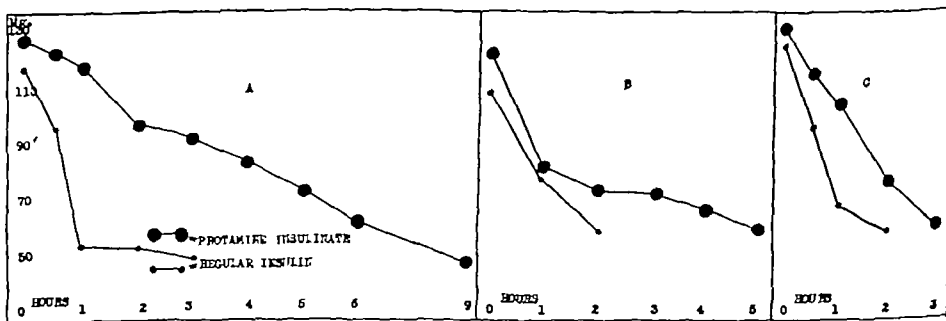


CHART 1 Comparison of blood sugar curves obtained after the injection of (A) 20 units of (B) 40 units and of (C) 80 units of protamine insulinate and regular insulin into a rabbit. Convulsions occurred at the end of each experiment.

When larger doses of protamine insulinate were injected into rabbits the effect on the blood sugar concentration was more rapid although still slower and more prolonged than with regular insulin. After the injection of 40 units of protamine insulinate three rabbits had hypoglycemic convulsions in five hours compared with two hours after the injection of the same amount of regular insulin. The administration of 80 units of the new insulin produced convulsions in two rabbits in three hours compared with two hours after the injection of the same quantity of the old insulin.

Protamine insulinate also has a slow and prolonged effect on the blood sugar of certain normal people. After the injection of 10 units of the new insulin in two individuals the blood sugar concentration decreased very slowly and

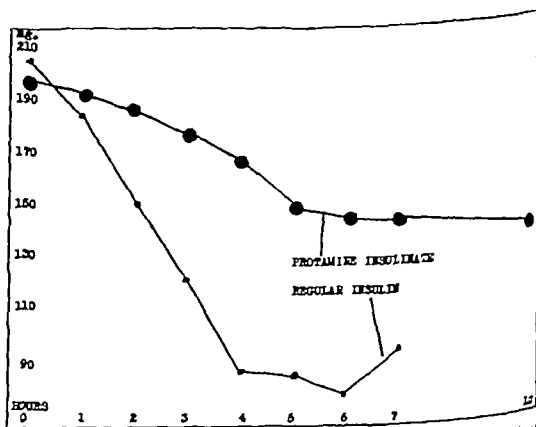


CHART 3 Blood sugar curves of a mild diabetic patient showing the relative effects of the injection of 10 units of regular and new insulin.



CAUSE OF DELAYED ACTION

The cause for the delayed action of the new insulin is believed to be due to the retarded rate of absorption of the protamine insulinate into the blood stream as the result of the compound being injected into the subcutaneous tissues as a suspension. However if this were true intravenous injection of this drug should cause a more rapid drop in the blood sugar than its subcutaneous injection and as sharp a drop as the injection of regular insulin. Nevertheless in eleven rabbits this was not always the case. Both intravenous and subcutaneous injections of the new insulin in doses of 80 units

hours. However when the supernatant fluid and the precipitate of this mixture were injected separately into rabbits there was even a more rapid drop in the blood sugar level than that obtained following the injection of the mixture. The animals convulsed in approximately two hours just as though regular insulin were injected. Apparently the serum dissolved some of the protamine insulin to give a rapid action. On the other hand the injection of the precipitate that was not dissolved in the serum gave as rapid a drop as that produced by regular insulin as shown in chart 5.

Apparently the slow and prolonged action of

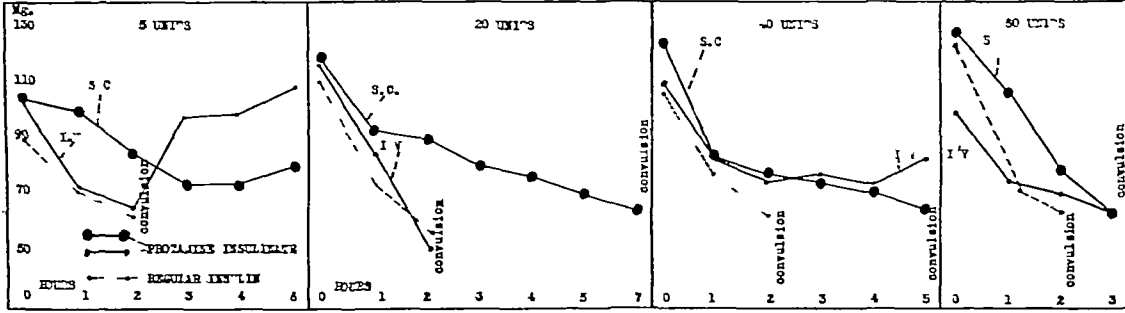


CHART 4. Blood sugar curves in rabbits showing varying effects of intravenous (IV) and subcutaneous (SC) injections of certain doses of protamine insulinate compared with the subcutaneous injection of regular insulin.

in one rabbit and 40 units in two rabbits caused practically the same type of drop in the blood sugar level and this was not very different in form from the curve produced by regular insulin. However, the intravenous injection of 40 and 20 units of protamine insulinate into three rabbits caused a more rapid drop in the blood sugar concentration than its subcutaneous injection and about as rapid a drop as that which occurs following the subcutaneous injection of the same amounts of regular insulin. The intravenous injection of 5 units of protamine insulinate into two rabbits caused a more rapid and obvious decrease in the blood sugar level than its subcutaneous injection. The drop for the first two or three hours was almost the same as that noted after the injection of 5 units of regular insulin and then the blood sugar level rose whereas the rabbits developed convulsions with the regular insulin. Illustrations are given in chart 4.

Other experiments were made on this subject by adding serum to protamine insulinate. Since there was a precipitate following admixture of the two the effects of the subcutaneous injection of the mixture of the precipitate and of the fluid portion were tested separately.

After injection into rabbits of 20 units of new insulin mixed with 5 cc of serum the blood sugar level dropped more rapidly than following the injection of the protamine insulinate alone and the rabbits convulsed in three to four

the new drug is dependent in some cases at least on something in addition to the process of absorption and is perhaps due in part to a chemical reaction in which the protamine insulinate is broken down in the body over a relatively long period of time. On the other hand Beecher and Krogh<sup>3</sup> made interesting micro-

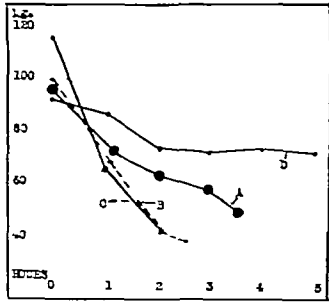


CHART 5. Relative blood sugar curves in rabbits following the subcutaneous injection of (A) 20 units of protamine insulinate mixed with 5 cc of serum, of (B) the fluid portion and of (C) the precipitate of an equal mixture and of (D) 20 units of protamine insulinate. The rabbits convulsed at end of tests A, B and C.

scopic observations on the absorption of regular and new insulin and found that ordinary insulin precipitated alone or with methylene blue at its isoelectric point practically disappeared within forty-five minutes after injection while protamine insulinate disappeared in five hours. However I wonder if the comparison of the absorption of the ordinary and new insulin by this method is accurate because the absorption

injected after an overnight fast. No food was taken during the test periods.

After the injection of 5 units of regular insulin into two rabbits the blood sugar concentration dropped rapidly from 104 mg to 50 mg in two and three hours and the animals developed convulsions. In comparison with 5 units of protamine insulinate the blood sugar concentration decreased gradually over a period of four hours to only 75 mg and then it returned to near the original level in about seven hours. In order to get a considerable effect on the blood sugar level within a period of seven to ten hours it was necessary to use comparatively large amounts of new insulin. Consequently, in subsequent experiments with rabbits larger doses were employed.

After the injection of 20 units of regular insulin into seven rabbits, there was a sharp and rapid drop in the blood sugar level and all the animals developed convulsions in about three hours. In contrast, after the administration of 20 units of protamine insulinate there was a gradual and slow decrease in the blood sugar concentration during the test period. Certain rabbits developed convulsions in nine hours after the injection, although this was not a general rule. Illustrations of the results obtained with various doses are given in chart 1.

gradually and a hypoglycemic level was reached in seven hours. In a third person the new insulin caused no decrease in the blood sugar. In contrast, the drop in the blood sugar level after the injection of regular insulin was more rapid as shown in chart 2.

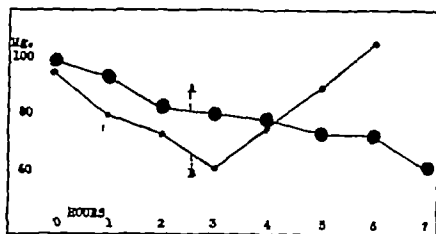


CHART 2 Blood sugar curves following the injection of (A) 10 units of protamine insulinate and of (B) 10 units of regular insulin into a normal woman

In two diabetic patients the injection of 10 and 20 units of protamine insulinate caused a gradual decrease in the blood sugar level in contrast to the relatively sudden and greater drop produced by regular insulin. An illustration of the results obtained is given in chart 3. The comparative effects of the two drugs appear more striking in diabetics than in normal persons, probably due to the more labile blood sugar seen in the former.

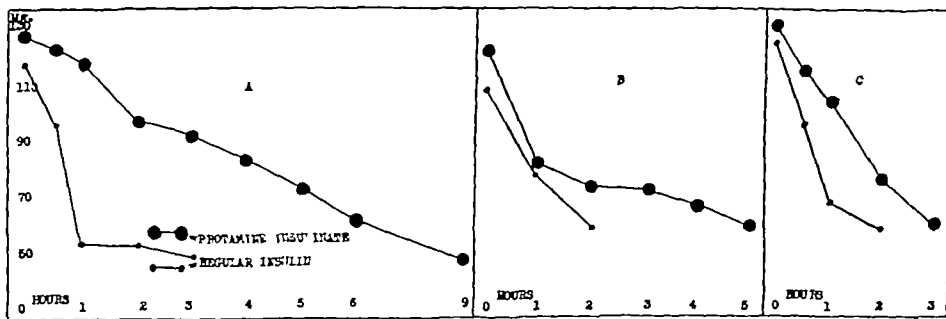


CHART 1 Comparison of blood sugar curves obtained after the injection of (A) 20 units of (B) 40 units and of (C) 80 units of protamine insulinate and regular insulin into a rabbit. Convulsions occurred at the end of each experiment.

When larger doses of protamine insulinate were injected into rabbits the effect on the blood sugar concentration was more rapid although still slower and more prolonged than with regular insulin. After the injection of 40 units of protamine insulinate three rabbits had hypoglycemic convulsions in five hours compared with two hours after the injection of the same amount of regular insulin. The administration of 80 units of the new insulin produced convulsions in two rabbits in three hours compared with two hours after the injection of the same quantity of the old insulin.

Protamine insulinate also has a slow and prolonged effect on the blood sugar of certain normal people. After the injection of 10 units of the new insulin in two individuals the blood sugar concentration decreased very slowly and

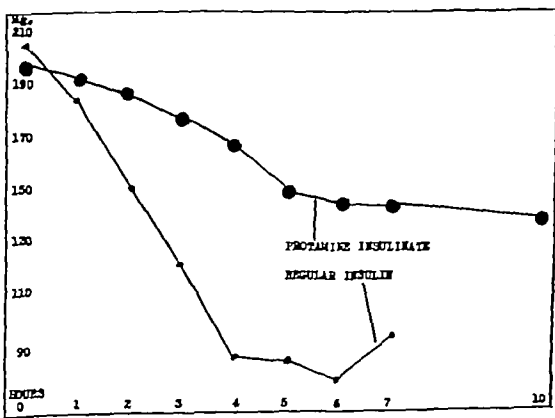


CHART 3 Blood sugar curves of a mild diabetic patient showing the relative effects of the injection of 10 units of regular and new insulin.

## CAUSE OF DELAYED ACTION

The cause for the delayed action of the new insulin is believed to be due to the retarded rate of absorption of the protamine insulinate into the blood stream as the result of the compound being injected into the subcutaneous tissues as a suspension. However, if this were true, intravenous injection of this drug should cause a more rapid drop in the blood sugar than its subcutaneous injection and as sharp a drop as the injection of regular insulin. Nevertheless in eleven rabbits this was not always the case. Both intravenous and subcutaneous injections of the new insulin in doses of 80 units

hours. However, when the supernatant fluid and the precipitate of this mixture were injected separately into rabbits there was even a more rapid drop in the blood sugar level than that obtained following the injection of the mixture. The animals convulsed in approximately two hours just as though regular insulin were injected. Apparently the serum dissolved some of the protamine insulin to give a rapid action. On the other hand the injection of the precipitate that was not dissolved in the serum gave as rapid a drop as that produced by regular insulin as shown in chart 5.

Apparently the slow and prolonged action of

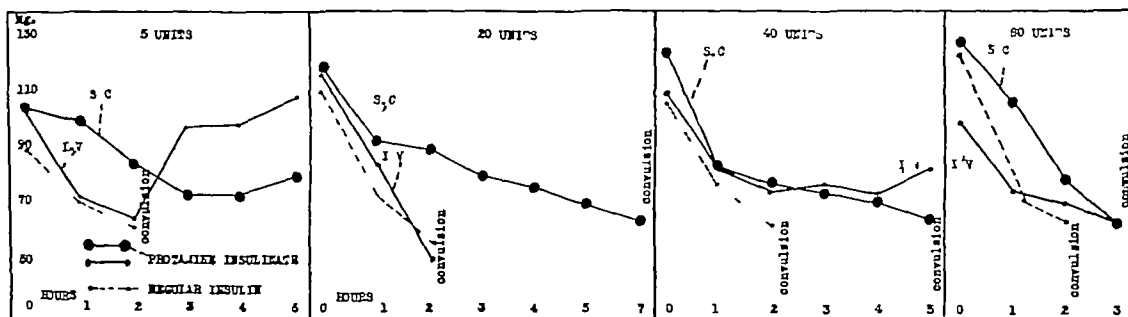


CHART 4 Blood sugar curves in rabbits showing varying effects of intravenous (IV) and subcutaneous (SC) injections of certain doses of protamine insulinate compared with the subcutaneous injection of regular insulin

in one rabbit and 40 units in two rabbits caused practically the same type of drop in the blood sugar level and this was not very different in form from the curve produced by regular insulin. However, the intravenous injection of 40 and 20 units of protamine insulinate into three rabbits caused a more rapid drop in the blood sugar concentration than its subcutaneous injection and about as rapid a drop as that which occurs following the subcutaneous injection of the same amounts of regular insulin. The intravenous injection of 5 units of protamine insulinate into two rabbits caused a more rapid and obvious decrease in the blood sugar level than its subcutaneous injection. The drop for the first two or three hours was almost the same as that noted after the injection of 5 units of regular insulin and then the blood sugar level rose whereas the rabbits developed convulsions with the regular insulin. Illustrations are given in chart 4.

Other experiments were made on this subject by adding serum to protamine insulinate. Since there was a precipitate following admixture of the two, the effects of the subcutaneous injection of the mixture, of the precipitate and of the fluid portion were tested separately.

After injection into rabbits of 20 units of new insulin mixed with 5 cc of serum the blood sugar level dropped more rapidly than following the injection of the protamine insulinate alone and the rabbits convulsed in three to four

hours. However, when the supernatant fluid and the precipitate of this mixture were injected separately into rabbits there was even a more rapid drop in the blood sugar level than that obtained following the injection of the mixture. The animals convulsed in approximately two hours just as though regular insulin were injected. Apparently the serum dissolved some of the protamine insulin to give a rapid action. On the other hand the injection of the precipitate that was not dissolved in the serum gave as rapid a drop as that produced by regular insulin as shown in chart 5.

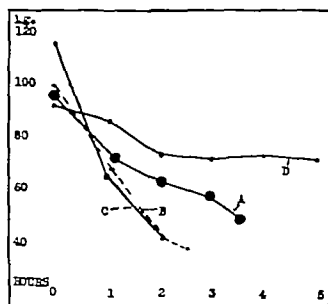


CHART 5 Relative blood sugar curves in rabbits following the subcutaneous injection of (A) 20 units of protamine insulinate mixed with 5 cc of serum, of (B) the fluid portion and of (C) the precipitate of an equal mixture and of (D) 20 units of protamine insulinate. The rabbits convulsed at end of tests A, B and C.

scope observations on the absorption of regular and new insulin and found that ordinary insulin precipitated alone or with methylene blue at its isoelectric point practically disappeared within forty-five minutes after injection while protamine insulinate disappeared in five hours. However, I wonder if the comparison of the absorption of the ordinary and new insulin by this method is accurate because the absorption

of regular insulin was observed as a precipitate and not as a solution

#### STABILITY OF PROTAMINE INSULINATE

It appeared of value to determine certain factors in relation to the stability of the new insulin. First, the effect of heat on the precipitate of protamine insulinate and on its blood sugar action was tested. This appeared important because of the possibility that a warm syringe used in measuring this drug might destroy it. Accordingly, several lots of the new insulin were exposed to varying temperatures in a water bath.

When protamine insulinate was heated for fifteen minutes at  $38^{\circ}\text{C}$ , the precipitate appeared to become finer, heavier and less flocculent. At  $57^{\circ}\text{C}$  the precipitate practically disappeared and remained so at temperatures of  $75^{\circ}\text{C}$  and  $98^{\circ}\text{C}$ . However, on cooling below  $57^{\circ}\text{C}$  a faint cloud reappeared.

After injection into rabbits of 40 units of protamine insulinate heated at  $38^{\circ}\text{C}$ , the resultant drop in the blood sugar curves was much the same as that observed following the administration of the same dose when not heated. After the injection of this amount of the drug exposed to temperatures of 57, 75 and  $98^{\circ}\text{C}$  for five to ten minutes, there was practically the same decrease in the blood sugar level during the first three hours as is seen after the administration of unheated protamine insulinate. However, subsequently the blood sugar concentration, instead of continuing to drop, began to rise. The results suggested that a sufficient amount of heat prevented the action

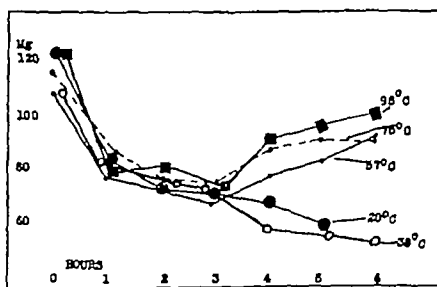


CHART 6 Blood sugar curves in a rabbit following injections of 40 units of protamine insulinate exposed to certain temperatures

of the new insulin after three hours, possibly in part due to the almost complete disappearance of the precipitate.

Tests were made to determine how long a batch of the new insulin retains its activity after admixture. Blood sugar curves in rabbits were observed following the injection of 20 units of freshly prepared protamine insulinate and after it stood for ten and twenty days. The results are shown in chart 7. After ten days the new insulin had less action on the blood sugar

concentration than when it was freshly prepared. At the end of twenty days its effect on the blood sugar level was almost negligible. It appears from these observations that protamine insulinate begins to deteriorate within a period of ten days after being mixed.

#### EFFECT OF GASTRIC JUICE ON THE NEW INSULIN

In a previous work I<sup>4</sup> was able to demonstrate that certain gastrointestinal enzymes digested regular insulin. It seemed of importance to ascertain whether this was also true of protamine insulinate. To determine this, 40 units of the new insulin was mixed with 10 cc of gas-

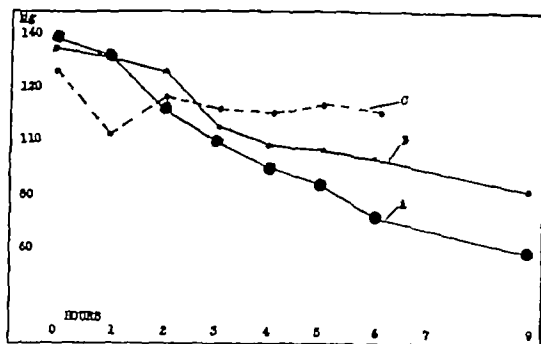


CHART 7 Blood sugar curves in a rabbit showing the effect of the injection of 20 units of protamine insulinate. A freshly mixed B after standing 10 days C after being prepared for 20 days

tric juice and incubated for one hour at  $37^{\circ}\text{C}$ . This was injected into a rabbit and the resultant blood sugar curve observed over a period of ten hours. There was no drop in the blood sugar level during the test period such as occurs when this drug alone is injected. The results suggested that the gastric juice destroyed completely the protamine insulinate, just as it destroys ordinary insulin.

#### SUMMARY

This paper presents a study of the effect of protamine insulinate on the blood sugar level under certain conditions.

The action of a given dose of protamine insulinate is less marked and more prolonged than that of an equal amount of ordinary insulin. The larger doses of protamine insulinate cause a more rapid drop in the blood sugar level than small doses although the effect is still prolonged. It is difficult to give any definite figure as to the comparison of the duration of the effect of the new and old insulin.

The cause for the delayed action appears to be due to the retarded rate of absorption of the new drug and also perhaps to a chemical reaction in which the protamine insulinate is broken down in the body over a relatively long period of time.

Protamine insulinate appears unstable under certain conditions. Heat at certain temperatures causes the precipitate to disappear practically and decrease its prolonged effect. Protamine insulinate is destroyed by gastric juice and consequently is ineffective when administered by mouth. After admixture the new insulin appears to lose some of its effect in ten days.

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## LIVING WITH A COLOSTOMY

BY EOLINE CHURCH DUBOIS, M.D.\*

**I**n view of the fact that colostomies are being done today for a variety of conditions in the large bowel, conditions which are apparently on the increase, it is evident that the management and care of the artificial anus are matters which should be well understood. But as a matter of fact, the average physician in general practice has had little experience with this type of case, and we have frequently seen patients after their discharge from some of the finest clinics in the country who have found their condition insupportable because they had not been taught how to care for themselves. Theoretically every surgeon recognizes his duty toward his patients in this respect and it is his intention that colostomy cases shall receive adequate instruction before leaving the hospital. But the one fundamental fact that is rarely taken into consideration is that the routine and ready care incident to hospital existence are in direct contrast to the problems of life as the ordinary individual finds it on the outside where he quickly becomes enmeshed in the tangled web of his responsibilities. There is every reason for enthusiasm regarding the brilliant results of surgery of the large intestine for the removal of malignant growths but it is evident from the many addresses on this subject to which we have listened that the surgeon is concerned only slightly with the aftercare of the new and strange opening in the abdominal wall. Indeed, this seems a small matter in view of the larger benefits gained, and yet it is impossible to ignore the fact even if it is unnecessary to magnify it, that an abiding handicap has been substituted.

What then are the fundamentals of instruction that the patient requires to accustom himself to the new order of things? These include matters of diet, methods of elimination, protecting devices and so forth.

It is obvious, in the first place that the small eater who is apt to be of the constipated type will find less difficulty in preventing the involuntary discharge of fecal matter than the hearty eater whose bowel functions have always

been regular. Abstemiousness while not an absolute necessity, is of great advantage in simplifying the management of this condition. It will be found that although a special diet is not necessary, the foods taken best are those easiest to digest with little waste, as bread, cereals, eggs, potatoes, milk, small amounts of vegetables, butter, cream, bacon, fruit juices in moderation, jellies, tender cooked meats, coffee and tea. There will always be certain foods fatal to the peace of mind of one who has a colostomy: onions, melons, fish and maple syrup serving as examples. After one has experimented for a while he will learn what dishes to avoid or at least how much he can take with safety. There is however another thing which must be taken into account and that is that routine must be followed so far as is possible regarding time as well as amount and kind of food. If a light lunch is habitually taken at noon, the substitution of a heavy meal will serve to stimulate bowel activity to an unusual degree and at a most inconvenient time. Changes in the weather, sudden extremes of heat or cold, unusual fatigue and mental distress may bring on attacks of diarrhea just as may happen to anyone with a relatively unstable constitution. As is true with all bodily conditions, the phlegmatic, deliberate, calm persons make any adjustment easier than those who find themselves beset by fears and doubts.

The apparatus necessary to receive the discharges from the artificial anus are next to be considered. The happiest situation is of course, to accustom the bowel to one movement each day in the morning immediately after breakfast and not to have to wear anything except a fold of gauze to protect the stoma. There are a few who are able to do this but nearly everyone, who has a colostomy must wear day and night some sort of a protective container against unexpected activity of the colon. It is extraordinary what cumbersome equipment has been devised for this condition, most of the colostomy bags being heavy and expensive though there are some which are very good. The patient will have to try out one or two before he makes his final choice. The simplest and best arrangement

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to my mind at the present time is a belt made of unbleached cotton with a round hole in it about four inches in diameter and a container of the same material, shaped like a doll's tam, which goes through the hole in the belt. Oiled silk which is removable lines the tam and about twelve sheets of ordinary toilet paper are placed next so that anything which goes into the container is easily disposed of by removing the paper. It is hard to imagine a simpler, more hygienic or more easily cared for device, and, furthermore, anyone can make it at the cost of only a few cents.

The prevention of colonic seeping or involuntary movements is managed by irrigations and by drugs. This is the most difficult part of caring for a colostomy. There are many patients who will just not be bothered with irrigations and are consequently made miserable and helpless victims of a condition that need not be intolerable if cared for correctly. Here again it is astonishing how complex and expensive is the equipment sold for this purpose. A patient despairingly told me that she could not take an irrigation in less than two hours, counting the time it took her to tidy the bathroom, put away her irrigating outfit and so forth. It goes without saying that most patients cannot afford expensive apparatus and, furthermore, when one goes away one does not wish to have to take an extra trunk or refuse invitations to visit in private homes. I have worked out a simple and easy method which anyone can follow anywhere there is a toilet and running water. An enamel basin, fourteen inches in diameter, a two quart douche bag and a rectal tube (26 Fr.) or a larger and longer colon tube, if preferred, are all the equipment necessary. No pail, no two-way catheter and no rubber pad are required. I give my patients these directions: Sit astride the toilet seat with both covers up facing the tank, hold the basin upright between the thighs to act as a splasher, insert the catheter already attached to the douche bag which is filled with warm water only and the water will flow into the colon and out carrying fecal matter to the basin which directs it to the toilet bowl. The douche bag is placed on the adjacent washstand, on the tank or if more convenient on one's shoulder. I mention this because, if one happens to be away from home, the convenient hook for hanging the bag may not be available. Four quarts of water are sufficient for a satisfactory irrigation and this usually occupies thirty minutes. During the next fifteen minutes while bathing and dressing, there will be a final gush of retained water and fecal matter after which the colon will probably be quiet for the next twenty-four hours. There is hardly any more time expended than taking an ordi-

nary bath. Basin, bag and tube can be carried anywhere, and the process can be carried out wherever there are toilet facilities and wherever one can have undisputed possession of the bathroom for three quarters of an hour. It is not necessary that this be done every day for in some cases every other day is sufficient. If one can train himself to have a morning defecation with little or no seepage during the remaining twenty-four hours, he is indeed fortunate. This can happen when the colostomy is pretty well down on the left side because the contents of the bowel at that point are considerably less fluid than higher up or to the right of the umbilicus.

As to drugs which are found useful, there are two which perform yeoman service in time of need, bismuth and paregoric, the former to thicken the intestinal contents and absorb the gas and the latter to quiet undue peristalsis. One may use bismuth, kaolin or charcoal in the absorption of offensive flatus, but, aside from the objection of expense, bismuth is the most satisfactory. Its dose varies from a teaspoonful daily to two or three times a week. The diet, of course, makes considerable difference in the fluidity of the intestinal contents as it does in the amount of decomposition products. Trouble ensues for the heavy meat eater and the one who eats too much in general, whereas abstemiousness pays large dividends in personal comfort. As to paregoric, this is only for emergencies when diarrhea occurs from eating too heartily of perhaps melons, waffles and maple syrup or other foods that easily excite peristalsis. Two teaspoonfuls of paregoric and one of bismuth subnitrate will quickly calm the colonic activity and in combination with a low residue diet (boiled milk, egg, toast, crisp bacon, tomato juice, blanc mange or jello with cream) for twenty hours, will permit re-establishment of the ordinary routine the following day.

It is necessary to understand clearly that each colostomy patient is an individual and that there is no one set of rules which will fit everybody or meet the exigencies of the case when he has left the hospital. The patient's own doctor, therefore, should take upon himself the work of rehabilitation and should make readjustments of diet, hours of rest, work and so forth so that the new order of things will not work unnecessary and unendurable hardships.

It is evident that the breaking of the colonic circuit is an operation for which there is a steadily increasing need and there is no doubt that it could give aid and comfort to many who now refuse it because the family physician fails to present the case in a light the patient can accept.

REPORT OF A CASE OF GAS BACILLUS INFECTION  
OCCURRING IN A WOUND FOLLOWING AN  
OPERATION FOR CHRONIC APPENDICITIS\*

BY BYRON E HOWE, M D †

**F**OLLOWING is a report of a case of gas bacillus infection originating in the abdominal wound of a patient operated for chronic appendicitis and treated with gas bacillus antitoxin with subsequent recovery. It is reported because of the comparative infrequency of infection of this sort and because of the extensive involvement of subcutaneous tissue and the peritoneal cavity. Comment is also made upon the gratifying effect of frequent doses of antitoxin.

The patient was a farmer by occupation 43 years of age with a history of recurrent attacks of appendicitis occurring over a period of 2½ years. The patient's mother has diabetes otherwise the family history was negative. He had pneumonia at the age of 20 and 2 years ago his teeth and tonsils were removed.

He was admitted to the hospital February 20 1936 for the usual preoperative preparation of the skin which included shave washing with mercury bichloride and alcohol application of tincture of metaphen and dry sterile dressing. On February 21 before operating the skin was again painted with tincture of metaphen and the appendix was removed through a right transrectus incision.

Following the operation on February 22 23 and 24 the patient had an excessive amount of abdominal pain and distention with considerable vomiting. On the morning of February 25 the patient appeared toxic and very weak. The abdomen was moderately distended and soft. Externally the wound appeared clean but extensive subcutaneous emphysema was present over the right side of the abdomen. This rapidly spread upward across the chest to the right side of the neck downward across the groin into the right thigh and across the midline in the suprapubic region.

Treatment consisted of opening the abdominal wound widely by removal of the stitches and inserting a rubber tissue drain down to the peritoneum and the intravenous injection of glucose and gas bacillus antitoxin (perfringens antitoxin 10 000 units and vibron septique antitoxin 10 000 units in syringes). The following doses of antitoxin were given:

Feb 25 1936—11 a m One syringe—20 000 units

Also at this time 2 000 units of gas gangrene antitoxin and 1 500 units of tetanus antitoxin were injected subcutaneously in the crepitating area above the right groin.

From the Surgical Service of the W B Plunkett Memorial Hospital Adams Massachusetts.

†Howe Byron E—Chief of Surgical Staff W B Plunkett Memorial Hospital Adams Mass. For record and address of author see "This Week's Issue" page 889.

Feb 26 1936—6 45 a m One syringe—20 000 units  
Feb 27 1936—Peritonitis symptoms developed at this time  
8 00 a m One syringe—20 000 units  
7 00 p m  
Feb 28 1936—7 10 a m  
8 00 p m  
Feb 29 1936—10 30 a m  
Mar 1 1936—12 45 a m  
9 00 p m

All of the injections of serum were given intravenously coincident with the use of glucose. The extension of the infection into the peritoneal cavity occurred after two doses of the serum had been given and it was associated with marked distention vomiting hiccoughs and a profuse thin watery discharge from the wound. This discharge was exceedingly copious for over 72 hours after which it gradually subsided. A heavy trace of albumin appeared in the urine. On February 25 the total white blood cell count was 5 200 with 64 per cent polymorphonuclears. The peritonitis was treated with frequent doses of powdered opium withdrawal of all fluids by mouth glucose by venoclysis and later by enemas and pitressin. It was felt both by the attendants and the patient that the administration of the serum was followed by temporary relief from the toxic symptoms.

Although several cultures were taken from the wound and from the fluid which drained from the abdomen the Welch bacillus was not isolated. A typical laboratory report follows:

Swab received

Smear—few leucocytes rare Gram positive cocci and short thick Gram positive bacilli

Culture—*B. welchii* not isolated

Note—*B. welchii* probably not on surface but in deeper tissues

Incision over the areas of crepitation was not made because of its apparent futility. Crepitus was still present in the axilla and right groin for 10 days after the onset. On March 7 with local anesthesia (novocaine) the wound edges were freshened with a scalpel and sutured together.

The patient was discharged from the hospital on March 15 the wound having healed without hernia. This has been confirmed at subsequent examinations.

It was believed that the organism was probably encountered in the skin at the time the incision was made and it was felt that the short incision that made it easier to prevent evisceration through the wound which showed no appearance of healing together with the massive frequent doses of serum were responsible for this patient's recovery.

# The Massachusetts Medical Society

## PROCEEDINGS OF THE COUNCIL

Stated Meeting, October 7, 1936

A STATED meeting of the Council was held in John Ware Hall, Boston Medical Library, 8 Fenway, Boston, on Wednesday, October 7, 1936, at 11 00 a m The President, Dr Charles E Mongan, Middlesex South, was in the chair and 149 Councilors were present (See Appendix No 1)

The President called the meeting to order and asked the Secretary to read an abstract of the minutes of the last meeting The Secretary announced that the record was published in full in *The New England Journal of Medicine* for July 30, 1936 and, after the principal actions of the Council were read, the President declared that the records as published were approved

The obituary of Dr Michael Francis Fallon of Worcester was read by the President who asked the Councilors present to stand in memory of a former colleague

DR MICHAEL FRANCIS FALLON of Worcester, Massachusetts, died at his home, June 24, 1936

Dr Fallon was born in Worcester in 1863 He graduated from Holy Cross College in 1883 and from the Harvard Medical School in 1887, subsequently studying abroad for two years before entering practice in Worcester With the founding of St Vincent Hospital, Dr Fallon was appointed to its staff, and in 1908 was advanced to the position of chief surgeon

He was a member of the Council of the Massachusetts Medical Society for many years, a former Vice-President and a former President of the Worcester District Medical Society Ex-Governor Walsh appointed Dr Fallon to membership on the State Board of Registration in Medicine in 1915 where he served the State for the succeeding seven years His other medical interests consisted of Fellowship in the American Medical Association, and in the American College of Surgeons, and membership in the New England Surgical Society

Dr Fallon is survived by his widow and a son, Dr John M Fallon, who was associated with his father in the practice of surgery

### REPORTS OF STANDING COMMITTEES

#### Arrangements

Dr Horatio Rogers, Suffolk Chairman of the Committee of Arrangements, presented his report (see Appendix No 2) and it was voted to hold the next Annual Meeting in Boston on June 1, 2 and 3, 1937

#### Membership and Finance

The report of this Committee was presented by the Chairman, Dr Blakely of Norfolk The report on membership recommended that four Fellows be allowed to retire, that the dues of three Fellows be remitted, that eight Fellows be allowed to resign and that seven Fellows be deprived of the privileges of Fellowship (See Appendix No 3) The report was accepted and the recommendations adopted

The report on finance recommended that the dues for the ensuing year should remain as at present, namely, \$10 00 for resident and \$6 00 for nonresident Fellows The report was accepted and the recommendation adopted

#### State and National Legislation

While the Committee had no formal report to make, the President read a letter which he expects to have printed in *The New England Journal of Medicine* in the near future in which the attention of the Fellows is called to the need of referring contemplated legislation to the Committee before its introduction into the Legislature (See Appendix No 4) The President explained that in previous years the Committee had been handicapped in its work by learning at the last minute of a bill which had been introduced under the auspices of some Fellow without previous consultation with the Committee

#### Medical Education and Medical Diplomas

The Chairman, Dr Reginald Fitz of Suffolk, informed the Council that following the receipt of a communication from Middlesex College, the Committee had held a special meeting at which it was voted to present the following recommendation to the Council

That the Massachusetts Medical Society inform the Trustees of Middlesex College that the Society is deeply interested in the improvement of all conditions which have to do with the giving of medical education in Massachusetts that the Society is anxious to do all that it can to help Middlesex College develop in an approved manner The Society suggests that the Trustees of Middlesex College lay before the President of the Society suggestions as to how the Massachusetts Medical Society might be of help to Middlesex College

In addition to the foregoing formal recommendation the Committee offered the suggestion that the President be empowered to appoint a



committee of Fellows of the Massachusetts Medical Society which would have power to act on behalf of the Society in an advisory capacity to any medical school or college in helping to direct such institution's efforts to develop and improve its facilities for teaching. The report of the Committee was accepted by vote. The Council next adopted the formal recommendation of the Committee and voted approval of the suggestion that the President appoint an advisory committee recommended by the Committee on Medical Education and Medical Diplomas.

#### *Permanent Home*

The Secretary read the report of the Committee on Permanent Home submitted by Dr Greenough who was unable to be present in person (See Appendix No 5). It was voted to accept the report and adopt the recommendation.

The following Standing Committees had no report to make: (1) Committee on Publications, (2) Committee on Ethics and Discipline, (3) Committee on Malpractice Defense and (4) Committee on Public Health.

#### SPECIAL COMMITTEES

##### *Cancer*

The Committee on Cancer submitted a written report signed by the Chairman Dr Greenough of Suffolk. The report was read and accepted (See Appendix No 6).

##### *Postgraduate Instruction*

The report of the Committee on Postgraduate Instruction was presented by the Secretary Dr Parkins of Suffolk, in the absence of Dr Ober (See Appendix No 7). This report was accepted and placed on file.

##### *Public Relations*

The report of the Committee on Public Relations was presented in sections by the Chairmen of Subcommittees.

Dr J Harper Blaisdell, Middlesex East reported for the Subcommittee on Hospital Relations. He recalled the action of the Council at its Annual Meeting in June, in which the Prepayment Hospital Plan was approved in principle and referred back to the Public Relations Committee for further conferences, and stated that pursuant to that vote two meetings had been held with the hospital group and with representatives of the pathologists, the roentgenologists and the anesthetists. The pathologists and the anesthetists chose to accept the conditions of the Hospital Plan and to receive their compensation through the corporation which is to be formed. The roentgenologists on the other hand preferred to submit their bills as private practitioners. There was no objection on the part of the hospital group to this decision

since, as a result, the cost to subscribers will be materially reduced. He reported that the Enabling Act, which will permit the formation of a nonprofit corporation, was passed by the Legislature and that six men have applied for incorporation papers. The proposed contract between the hospital corporation and subscribers is at present in the hands of the Insurance Commissioner. He outlined briefly the action which will follow the approval of the Commissioner and stated that the Massachusetts Medical Society and the District Societies in which participating hospitals are located will be represented on an Advisory Council. The President explained the reason for special legislation in this case and in reply to a question from Dr Parkins stated that the policy will be open to groups and not to individuals. The report was accepted.

Dr Frothingham, Suffolk presented the report of the Subcommittee on Public Health and Practitioner. He stated that the Subcommittee had tried to arrange with the public health authorities that immunization work be done by private practitioners as far as possible. He pointed out that it was necessary for the private practitioner to cooperate with the authorities in this matter, or the latter would be forced to take it over. The report was accepted as one of progress.

In the absence of the Chairmen of other Subcommittees the President asked for the reports of committees appointed to consider petitions of former Fellows for restoration to membership (See Appendix No 8). The Secretary read the complete list and the recommendations were approved by the Council.

The Secretary stated that Dr George L Lemaitre of Methuen asked for restoration to membership and the President appointed an investigating committee consisting of Drs John F Curtin, Chairman, John G Miller and Joseph L O'Reilly.

The President appointed as Auditing Committee for the ensuing year Dr Harry P Cahill, Chairman of Norfolk and Dr Edmund H Robbins, of Middlesex South. These appointments were confirmed by the Council.

The Secretary presented a request from the Medical Library Association that certain resolutions be adopted by the Council. These resolutions (see Appendix No 9) were then presented and were formally adopted.

In carrying out the vote of the Council passed at the June meeting in Springfield, the President appointed a committee of five to consider the matter of expert testimony as given in courts of law by members of the Society. He appointed the following Fellows to serve on this committee: Dr George L Schadt, Chairman, Hampden; Dr David Cheever, Suffolk; Dr Francis

P McCarthy, Norfolk, Dr Walter G Phippen, Essex South and Dr James J Goodwin, Worcester. The President's action was approved.

There was considerable discussion concerning the resolution presented at the meeting of the Council, held in February, 1936, by Dr Levi of Middlesex South. It was finally voted to refer the matter to the Committee on Medical Education and Medical Diplomas.

The President asked the Secretary to read a communication received from the Massachusetts Public Health Association which was published in *The New England Journal of Medicine* for June 11, 1936. This contained a resolution asking for the appointment of a committee to serve as a liaison agency between the Massachusetts Public Health Association and the Massachusetts Medical Society. (See Appendix No 10.) The Secretary announced that he had been directed by the President to inform the Massachusetts Public Health Association that the Subcommittee on Public Health and Practitioner of the Public Relations Committee would be designated to serve in this capacity. This action was approved by vote.

Dr E F Cody of Bristol South, the senior Delegate from Massachusetts to the Annual Meeting of the American Medical Association, held in Kansas City May 11-15, 1936, presented his report. He stated that the attendance was unusually high and that distinguished guests from abroad were present at the meeting. In the meetings of the Scientific Assembly, twenty-eight Fellows of the Massachusetts Medical Society presented papers or led in discussions. The Society was likewise well represented in the Scientific Exhibits. He stated that the President, Dr Mongan, was appointed Chairman of the Reference Committee on Executive Session and that Dr Cody had served on the Reference Committee on Reports of the Board of Trustees and Secretary. He quoted from the figures of the Secretary's report which showed the number of members on March 1, 1936, 101,754 and the number of Fellows 62,997. He spoke briefly of the publications conducted by the American Medical Association. He quoted from the Treasurer's report which showed that the Association now has total assets exceeding three and one-half million dollars. He mentioned the work done by certain of the Councils and Special Committees of the American Medical Association. Many matters were covered under the heading of "new business" which will be found in the published Proceedings. He referred particularly to the effective work of the Reference Committee which had considered the study made by a committee appointed to study contraceptive practices and related problems. The Reference Committee approved of the committee's recommendation that the study be continued and

concurred in the committee's disapproval of propaganda directed to the public by certain lay organizations.

He announced that at the last meeting of the American Medical Association the following officers were elected:

President-Elect, John H J Upham  
Vice-President, Charles Gordon Heyd  
Secretary, Olin West  
Treasurer, Herman L Kietzschmei  
Speaker, Nathan B Van Etten  
Vice Speaker, Harrison H Shoulders  
Trustee, Thomas S Cullen

Dr Cody's report was accepted by vote.

The President asked the Secretary to read the report of Dr Hanford Carvell who had been appointed Delegate to the Annual Meeting of the Maine Medical Association. Dr Carvell stated that he had attended the meetings on June 22 and 23 and that he had conveyed the greetings of the Massachusetts Medical Society. He commented on the cordial reception given to him.

The President announced that because of ill health Dr Baile of Bristol South had been forced to resign from the Public Relations Committee and that the District Society had chosen as his successor Dr Aubrey J Pothier.

The President then announced that since Dr Tighe of Middlesex North had arrived he would ask him to report for the Subcommittee on Social Legislation and Insurance of the Committee on Public Relations.

Dr Tighe explained that the work of his committee in the education of the public concerning Compulsory Sickness Insurance was still going on, but that on account of political activities it appeared unwise to attempt radio broadcasts until after the election. He informed the Council that the results of the election would have a bearing upon the type of program adopted by the committee. He mentioned the fact that he had been invited to deliver a talk before the Massachusetts State Federation of Women's Clubs at its Ipswich meeting in the near future.

Dr Tighe then gave an account of another matter which had been referred to the committee. This was an editorial which had appeared in *The New England Journal of Medicine* for September 17 entitled "A Suit Against a Physician." It appears that the physician's malpractice insurance does not protect him in certain cases of suits growing out of commitments of persons allegedly insane. The insurance companies state that under the law such suits are not for malpractice but are for conspiracy which is a criminal offense. Certain companies, however, have agreed to conduct the defense of the physician thus sued, but will not be responsible for the payments of awards resulting from

such suits. The committee has in mind various conferences with insurance companies and others which are designed to meet this complicated situation. Dr Tighe's report was accepted as one of progress.

Dr Hunt of Worcester reported for the Subcommittee of the Committee on Public Relations on the Adequacy of Medical Care and stated that a survey of five hundred families had been completed and published in the *Journal*. This was done at a cost to the Society of \$500.00. The committee recommended that inasmuch as an extension of this survey to the thousand families originally contemplated would probably not yield sufficient additional information to justify the expenditure of the balance of the \$1,000.00 appropriation made by the Council the study be discontinued. He referred to the action of the Council at the Annual Meeting last June by which the appointment of Medical Service Councils was approved. He stated that he had prepared a brief report on the question "Why a Medical Service Council?" This he expects to submit to the *Journal* for publication. In this communication will be outlined what is contemplated. The President stated that if there were no objections Dr Hunt's recommendations concerning the Medical Service Councils would be referred to the Subcommittee on Public Health and Practitioner and that the Subcommittee on the Adequacy of Medical Care would be authorized to discontinue its survey. This action was confirmed by vote.

Dr R. M. Smith, Suffolk, suggested the possibility of the Council's taking more definite action in relation to the form which these Medical Service Councils should take and stated that it seemed that such groups offered one of the most effective means of accomplishing the end in which we are all interested. The President stated that he believed the machinery was already at hand and that since some money was left from the original appropriation to the Committee on Public Relations it would not be necessary to ask for additional money at this time.

Dr Bagnall, Essex North, proceeded to read a resolution (See Appendix No. 11). Dr Bagnall explained that Dr Wakefield of the State Department of Public Health informed him that the formal approval of the program for the relief of crippled children was awaiting the approval of the Society. He stated that the public health authorities had gone all the way in cooperating with the medical profession. He recalled that there had been consultation with officers of the State Society at the beginning and that subsequently at the suggestion of the President each District Society President had been consulted. The plan finally adopted pro-

vides that anyone must have the endorsement of the family physician before he can be admitted to the children's clinic. He also referred to the committees appointed in each district which assure to the Medical Society the protection of its interest. He stated that the clinics are under the auspices of the Social Security Program of the Federal Government and that while the operation is supervised by the State Department of Public Health the entire matter comes under a federal rather than a state law.

President Mongan made certain further explanations of the activities being conducted under the Federal Security Act and stated that the Commonwealth was obliged by the federal law to go ahead with the program. He gave to the Council a list of the members of the General Advisory Board which assists the Public Health Commissioner in administering the law dealing with crippled children. He stated that Pittsfield, Greenfield, Springfield, Gardner, Lowell, Brockton, Fall River, Haverhill and Salem have already appointed their cooperating committees. The resolution presented by Dr Bagnall was then adopted by vote.

Dr W. G. Grandison, Middlesex South, called attention of the Council to what he considered to be an infringement on the rights of the general practitioner in connection with a commitment of the mentally sick. His statement was heard by the Council and the President ruled that since this was a matter which concerned the practitioner and public health it would be referred to that Subcommittee of the Committee on Public Relations. There being no objection it was so ordered.

Dr Snow, Essex North, was recognized by the President and stated that he was instructed by the Essex North District Medical Society to bring to the attention of the Council the matter of a resolution adopted by the Roentgenological Society of North America in its executive session on December 3, 1935 (See Appendix No. 12). He then offered comments submitted by the Essex North District Medical Society (See Appendix No. 13). The President stated that these resolutions would be referred to the Subcommittee on Hospital Relations.

Dr M. C. Sosman, Suffolk, offered an explanation for the action taken by the Roentgenological Society and stated that he had communicated with the executive committee of that society which has agreed to bring the matter up once more at the next annual meeting in December with the intention of withdrawing the resolution.

The President directed the Secretary to bring an additional matter to the attention of the Council. The Secretary stated that it has been proposed that the Council be notified at this time that official notice will be given at the

February meeting regarding proposed changes in the By-Laws as follows

*Chapter VI* Section 1 entitled Duties of President to be changed by striking out the sentence which reads, He shall be *ex officio* chairman of the Committee on State and National Legislation" and by adding the sentence 'He shall be a member of all Standing and Special Committees by virtue of his office'

*Chapter VII*, Section 6 entitled Duties of the Committee on State and National Legislation to be changed by striking out the words the President being *ex officio* chairman" so that the first sentence shall read The Committee on State and National Legislation shall consist of five fellows

The President stated that this was offered for information and could not be acted upon at this session

There then followed some comment upon the acoustics of the hall in which the meeting was being held and it was suggested by one of the Councilors, Dr Kickham of Norfolk, that more adequate amplifiers be provided since it was impossible for the Councilors in the rear of the hall to follow discussions and to vote intelligently upon important matters. He made the suggestion, therefore, that the Secretary be instructed to remedy the situation. The President accepted the suggestion.

The meeting adjourned at 1 15 p m

ALEXANDER S BEGG, M D,  
Secretary

#### APPENDIX NO 1

##### ATTENDANCE OF COUNCILORS

BARNSTABLE	J F Jordan
M E Champion	C H Phillips
BERKSHIRE	FRANKLIN
R J Carpenter	W J Pelletier
	H M Kemp
BRISTOL NORTH	H G Stetson
W H Allen	A H Wright
A R Crandell	
BRISTOL SOUTH	HAMPDEN
J M Bonner	P E Gear
J A Barré	F H Allen
G W Blood	T S Bacon
E F Cody	E P Bagg
E D Gardner	J M Birnie
P E Truesdale	J L Chereskin
	Frederic Hagler
ESSEX NORTH	M W Pearson
E S Bagnall	A G Rice
R V Baketel	G L Schadt
C S Benson	H L Smith
J F Burnham	
Z W Colson	MIDDLESEX EAST
H F Dearborn	J H Blaisdell
H R Kurth	Richard Dutton
G L Richardson	E M Halligan
F W Snow	R R Stratton
ESSEX SOUTH	MIDDLESEX NORTH
C A Bonner	F P Murphy
N P Breed	A R Gardner
J F Donaldson	

G A Lahey  
T A Stamas  
M A Tighe

G V Higgins  
C A Sullivan

##### MIDDLESEX SOUTH

S H Remick  
C F Atwood  
E W Barron  
C F K Bean  
G F H Bowers  
C O Chase  
F R Clark  
B F Conley  
A C Cummings  
D F Cummings  
H F Day  
H Q Gallupe  
W G Grandison  
A M Jackson  
A A Levi  
R A McCarty  
J A McLean  
Edward Mellus  
C E Mongan  
F L Morse  
J P Nelligan  
E J O'Brien Jr  
Dwight O'Hara  
C T Porter  
T E Reilly  
E S A Robinson  
E J Sawyer  
E F Sewall  
F G Smith  
H P Stevens  
H W Thayer  
Fresenius Van Nüys  
R H Wells  
M W White  
W S Whittemore

##### PLYMOUTH

Charles Hammond  
P H. Leavitt

##### SUFFOLK

Conrad Wesselhoeft  
W B Breed  
C S Butler  
R L DeNormandie  
J M Doran  
G B Fenwick  
Reginald Fitz  
Channing Frothingham  
Joseph Garland  
G L Gately  
E P Joslin  
F H. Lahey  
T H. Lanman  
C C Lund  
W J Mixter  
N A. Nelson  
J P O'Hare  
L E Parkins  
Helen S Pittman  
W H Robey  
Horatio Rogers  
G C Shattuck  
R. M. Smith  
M C Sosman  
I J Walker  
Shields Warren

##### WORCESTER

R J Ward  
J C Austin  
W P Bowers  
L R. Bragg  
P H Cook  
G A. Dix  
E B Emerson  
G E Emery  
J J Goodwin  
David Harrower  
E L Hunt  
E R Leib  
W F Lynch  
A W Marsh  
J W O'Connor  
W C Seelye  
F H Washburn  
R P Watkins  
S B Woodward

WORCESTER NORTH  
Sherman Perry  
C J Laserte

##### NORFOLK

Maurice Gerstein  
F G Balch  
A. S. Begg  
D N Blakely  
H M Emmons  
C B Faunce Jr  
L M Freedman  
W A Griffin  
C J Kickham  
H M Landesman  
J S H Leard  
M V Safford  
D D Scannell  
Max Sturnick

NORFOLK SOUTH  
C S Adams

#### APPENDIX NO 2

##### REPORT OF THE COMMITTEE ON ARRANGEMENTS

The Annual Meeting of the Society in 1937 will be held in Boston. The best dates appear to be Tuesday Wednesday and Thursday June 1 2 and 3 since the holiday May 30 falls on a Sunday and will therefore be observed on Monday.

I move that these dates be approved by the Council for the 1937 meeting of the Society.

Respectfully submitted  
HORATIO ROGERS Chairman

APPENDIX NO 3

REPORT OF THE COMMITTEE ON MEMBERSHIP  
AND FINANCE ON MEMBERSHIP

This Committee recommends

1 That the following named four Fellows be allowed to retire under the provisions of Chapter 1, Section 5, of the By Laws

- 1 Cleary James, Cambridge, with remission of dues 1935 1936
- 2 McClusky Henry Lincoln, Worcester with remission of dues 1934 1935 1936
- 3 Moody Flora Frost Springfield with remission of dues 1934, 1935 1936
- 4 Howland George Lewis, Jamaica Plain

2 That dues of the following named three Fellows be remitted under the provisions of Chapter 1 Section 6 of the By-Laws

- 1 Bailey Florence Lawrence 1935 (part) 1936
- 2 Hampson, Nishan M Watertown 1934 1935 1936
- 3 Simon, Arthur Leslie Lawrence 1935

3 That the following named eight Fellows be allowed to resign under the provisions of Chapter 1 Section 7, of the By Laws

- 1 Andrews John Raymond Burlington Vt. with remission of dues, 1934 1935 1936
- 2 Elv, Julian Griffin Old Lyme Conn.
- 3 Nolin, Francis Harry Claremont, N H, with remission of dues 1934 1935 1936
- 4 O'Meara John George Providence R I
- 5 Rogell Harold Providence R I with remission of dues 1936
- 6 Thompson John James Danville Ill
- 7 Smith Lawrence Weld Philadelphia.
- 8 Gilbert, Alfred Edmund Nevada Iowa

4 That the following named seven Fellows be deprived of the privileges of Fellowship under the provisions of Chapter 1 Section 8 Clauses (a) and (b) of the By Laws

- 1 Baghdoyan Nerses Manoug Winchester
- 2 Cliff Frederica Leigh Boston
- 3 Fraser William Leslie, Lynn
- 4 Fuller David Herman address unknown
- 5 Marcus, Jacob Boston
- 6 Mason James Herman Worcester
- 7 Worthy, William Boston

DAVID N BLAKELY *Chairman*

October 7 1936

APPENDIX NO 4

LETTER TO BE SENT TO THE FELLOWS OF THE  
MASSACHUSETTS MEDICAL SOCIETY

*To the Fellows of the Massachusetts Medical Society*

With the knowledge that the opening of the General Court is but a few weeks away undoubtedly many individuals have in mind legislation designed to correct injustices or to promote the interests of the medical profession

Undoubtedly as in the past some such legislation will be proposed in good faith and with the best intentions but without thorough study and consideration by the proper committees of the Society

It is therefore requested that if the support and backing of the Society are desired by proponents of medical legislation either individual Fellows

committees or even state departments, that such proposals should be submitted to the Secretary for presentation to the Committee on State and National Legislation for study and report.

CHARLES E MORGAN *President*  
*Massachusetts Medical Society*

APPENDIX NO 5

REPORT OF THE COMMITTEE ON PERMANENT HOME

Since the last meeting of the Council the Agreement with the Boston Medical Library regarding the contribution of the Massachusetts Medical Society to the expenses of the Boston Medical Library by reason of the occupancy of the Medical Society of its headquarters in the Library came up for renewal and this agreement has been renewed for the next three years and has been completed and signed by the President of the Library and the Chairman of the Committee on Permanent Home at the same rate as was accepted for the previous period

Respectfully submitted  
R B GREENOUGH *Chairman*

APPENDIX NO 6

REPORT OF THE COMMITTEE ON CANCER

The Committee on Cancer respectfully reports that it has continued to cooperate with the cancer educational activities carried on by the Massachusetts Department of Public Health and the Massachusetts Branch of the American Society for the Control of Cancer. In this connection the Committee has offered its cooperation in the national project of the American Society for the Control of Cancer which is now being organized as the 'Women's Field Army' of the American Society which is designed to promote the education of the public in regard to cancer through the National Federation of Women's Clubs. The campaign for the enlistment of workers in this Women's Field Army is to take place in March, 1937

Respectfully submitted  
R B GREENOUGH, *Chairman*

APPENDIX NO 7

REPORT OF THE COMMITTEE ON POSTGRADUATE  
INSTRUCTION

October 7, 1936

The Committee wishes to report that the extension courses have been organized throughout the state. Sixteen districts are participating the first sessions will begin today in the Middlesex, East and Hampshire Districts. The entire series will be completed by January 1 1937

FRANK R. OBER, *Chairman*  
LEROI E PARKINS *Secretary*

APPENDIX NO 8

REPORTS OF COMMITTEES TO CONSIDER PETITIONS FOR  
RESTORATION TO THE PRIVILEGES OF FELLOWSHIP

(1) Theodore Bennett Brookline (Committee  
Charles J Kickham Frederick L Hayes and  
Arthur I. Shafer)

(2) William E Buck, Randolph (Committee Cornelius A Sullivan Frank W Crawford and Nahum R Pillsbury)

(3) Aaron Kaufman Boston (Committee Joseph J Skirball Allen P Joslin and Maurice B Strauss)

(4) Lawrence K. Kelley, Tewksbury (Committee John H. Lambert, Howard W Jewett and Harold L. Leland)

(5) William E Langevin Southbridge (Committee Alvin R. Moses Theodore L. Story and Stuart M Gibson)

(6) A. H. Riordan, Indian Orchard (Committee Michael W Harrington, Arthur J Horrigan and George L Steele)

(7) Arthur F Sargent Boston (Committee Francis C Hall, Robert H Morris and Edward Harding)

(8) George E Tucker Salem (Committee Henry Tolman Jr J Frank Donaldson and DeWitt S Clark)

(9) John Verdone Boston (Committee Gerardo M Balboni, Fletcher H Colby and Harlan F Newton)

(10) P. H. Walsh Fall River (Committee George C King, James C McAdams and Howard P Sawyer)

(11) Daniel Wexler New Bedford (Committee Edwin D Gardner Daniel P O'Brien and Frank M Howes)

#### APPENDIX NO 9

##### RESOLUTIONS ASKING CONGRESS TO SUPPORT WORK OF THE SURGEON-GENERAL'S LIBRARY

In response to a request received from the Medical Library Association the following Resolution is offered for adoption

WHEREAS The value and usefulness of the *Index Catalogue* is dependent upon the completeness of the files of medical publications contained in the Library of the Surgeon General's Office—a public national medical library the greatest in the world serving in its present form of administration with satisfaction to the medical profession and the medical libraries of our country, and

WHEREAS In recent years the annual appropriation of the Congress has been wholly inadequate to provide sufficient funds to acquire the current medical books and periodicals issued throughout the world so that they might be available for use throughout the country and for inclusion in the *Index Catalogue*

THEREFORE BE IT RESOLVED That the Massachusetts Medical Society urges the Congress to appropriate annually to the Library of the Surgeon General's Office an adequate sum for current medical books and periodicals and for the purchase of back publications lost during those recent years when the amount granted was grossly inadequate thus depreciating the completeness and usefulness of the Library's collection and an additional sufficient sum annually for as many years as may be required in order to make for the greatest possible completeness of the collection and its *Catalogue* and

BE IT FURTHER RESOLVED That this Resolution be published in full in *The New England Journal of Medicine* and that reprints of the Resolution as published be sent to Representatives and Senators from Massachusetts following the November elections

#### APPENDIX NO 10

Extract from *The New England Journal of Medicine*, issue of June 11 1936

THE MASSACHUSETTS PUBLIC HEALTH ASSOCIATION  
Report of the Committee on the Relationship of Boards of Health to the Medical Profession

5 Finally be it resolved that to further these mutual interests of Health Departments and physicians it is recommended that the Massachusetts Medical Society be invited to appoint a committee or delegates to meet with a committee of the Massachusetts Association of Boards of Health to discuss from time to time matters of joint interest and concern

#### APPENDIX NO 11

##### RESOLUTION ON CLINICS FOR CRIPPLED CHILDREN

It is hereby resolved that the Council of the Massachusetts Medical Society endorses the program of the Clinic for Crippled Children as outlined by the Department of Public Health and hereby expresses its approval of the manner in which the Department of Public Health has endeavored to cooperate with the Massachusetts Medical Society

#### APPENDIX NO 12

##### RESOLUTION CONCERNING RADIOLOGISTS RELATION TO HOSPITALS

WHEREAS proper ethical standards of a physician are essential for the securing or the retention of membership in the Radiological Society of North America and

WHEREAS certain physicians have by the replacement of more ethical physicians aided certain lay groups and corporations in their attempts to practice radiology and

WHEREAS such practices are inimical to the best interest of medicine of radiology and of the radiologists concerned

Now therefore be it

RESOLVED that it is unethical for any radiologist to replace another radiologist in an institution without the consent of the incumbent except for cause and provided that if cause be claimed the matter shall be referred to the Counselor for the State in which the incumbent resides the said Counselor being hereby directed to form a tribunal to be composed of the said Counselor a physician representing the incumbent a physician representing the applicant and a representative of the institution involved and one additional member to be chosen by these This tribunal shall examine the allegations and matters in controversy and shall render a decision forbidding or permitting the replacement of the said incumbent and

Be it

FURTHER RESOLVED that violation of these rules shall constitute unethical conduct and shall be grounds for expulsion from this Society

This resolution was adopted by the Radiological Society of North America in Executive Session at its twenty first Annual Meeting on December 3 1935 at Detroit Michigan

Reprinted from *I radiology* 26 247 (Feb) 1936

APPENDIX NO. 13

COMMENTS BY THE ESSEX NORTH DISTRICT MEDICAL SOCIETY AT ITS ANNUAL MEETING IN SALEM IN MAY, 1936

The Essex North District Medical Society at its Annual Meeting in May 1936 voted to present the resolutions adopted by the Radiological Society of North America to the Council of the Massachusetts Medical Society with the following comments:

"These resolutions are an arrogant invasion of the rights of hospitals and physicians. The Society appropriates for its members the exclusive use of equipment owned by hospitals and claims for them life tenure of office. It prescribes penalties for infraction of its rules which amount virtually to a boycott of hospitals. To extend these principles to all Departments of Medicine would be fatal to the spirit of progress. What if the American Surgical Association and other special societies should attempt to support the claims of their members for exclusive rights in designated Communities?"

"These resolutions should not be accepted supinely by hospital trustees and physicians. The hospitals own the equipment and have some voice in its use. It might be inconvenient to dispense with the services of highly specialized radiologists but a showdown on this subject would demonstrate effectively that their ideas have become decidedly overinflated.

This matter is brought to the Council because it is felt that if such an attitude is adopted by any subdivision of the Medical Profession it will tend to disrupt the practice of medicine as a whole. The District Society feels that these resolutions suggest the principles of Union Labor. If they are carried a little farther it is easy to visualize a hospital being boycotted because of unfair treatment to its Radiological Staff. One can almost see a picket line with the medical profession marching in front bearing the placards. This hospital is unfair to Union Doctors.

The Essex North has no motion to offer. It firmly believes that the Radiologists of Massachusetts as a body do not approve of such drastic measures but it does feel that this matter is of sufficient importance to be brought to the attention of the Parent Society.

ANSWERING S O S CALLS OF A NATION

When floods swept Eastern States and tornadoes devastated four Southern cities this spring the Red Cross was on the job to help the injured and homeless.

These disasters affecting more than a hundred cities and towns and large sections of our rural population imposed the greatest task on the Red Cross Chapters and upon the National organization since the Mississippi flood in 1927.

Beginning on April 13 when quick thaws melted millions of tons of snow and ice on New England hills turning placid streams and leisurely rivers into raging torrents calls for assistance were made upon the Red Cross Chapters in the affected areas sprang into action to care for those made homeless and National personnel was sent to points where additional help was needed.

A return of cooler weather stemmed this first rise of Eastern rivers leading many to believe that the principal danger was past. But in this lull just prior to the rivers second and more serious rise the Red Cross fairly hummed with activity. Chapters in threatened areas perfected disaster relief organizations previously set up just in case a disaster should strike.

As a result of this planning and cooperation the record breaking flood stages of April 17 and 18 did not find communities unprepared. Excitement ran high but underlying individual uncertainty and fear was the consciousness of organized effort under definite leadership. Some groups undertook the work of getting families from their homes and preparing food others went to work establishing temporary shelters in schools and public buildings others handled clothing distribution first aid units

functioned to give emergency care to the injured and to see that they received medical care and if needed hospitalization.

So well did this volunteer organization and the cooperating agencies function that less than 70 lives were lost in these spring floods.

Another type of Red Cross disaster relief work was exemplified in the South when terrific tornadoes made shambles of four cities in Georgia, Mississippi and North Carolina. Here there was no warning. Death-dealing destruction hit as swiftly and unexpectedly as would an air raid from another planet. Aiding the sick and injured and providing emergency care for the thousands made homeless was the Red Cross job.

After meeting the emergency needs of the victims of both the floods and tornadoes the Red Cross began the work of rehabilitation, assisting those families without resources to rebuild, repair and rerun their homes. This task required the services of many trained disaster relief workers since each family's requirements were considered individually.

Never has the worth of the Red Cross with its more than 3,700 Chapters and 9,000 Branches organized in practically every county in the United States and its experienced National Staff been more clearly demonstrated on disaster scenes than in these floods and tornadoes. Your continued support through enrollment in your local Red Cross Chapter is necessary to keep the Red Cross prepared to answer future appeals for help and to continue its normal peacetime programs of first aid and life-saving nursing assistance to war disabled veterans and so forth, in your community.

Join during the Poll Call held each year from Armistice Day to Thanksgiving.

(2) William E. Buck Randolph (Committee Cornelius A. Sullivan Frank W. Crawford and Nahum R. Pillsbury)

(3) Aaron Kaufman, Boston. (Committee Joseph J. Skirball Allen P. Joslin and Maurice B. Strauss)

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(10) P. H. Walsh Fall River (Committee George C. King James C. McAdams and Howard P. Sawyer)

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BE IT FURTHER RESOLVED That this Resolution be published in full in *The New England Journal of Medicine* and that reprints of the Resolution be sent to Representatives and Senators from Massachusetts following the November elections

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WHEREAS such practices are inimical to the best interest of medicine of radiology and of the radiologists concerned

Now therefore be it

RESOLVED that it is unethical for any radiologist to replace another radiologist in an institution without the consent of the incumbent, except for cause and provided that if cause be claimed the matter shall be referred to the Counselor for the State in which the incumbent resides the said Counselor being hereby directed to form a tribunal to be composed of the said Counselor a physician representing the applicant and a representative of the institution involved and one additional member to be chosen by these. This tribunal shall examine the allegations and matters in controversy and shall render a decision forbidding or permitting the replacement of the said incumbent and

Be it

FURTHER RESOLVED that violation of these rules shall constitute unethical conduct and shall be grounds for expulsion from this Society

This resolution was adopted by the Radiological Society of North America in Executive Session at its twenty first Annual Meeting on December 3 1935 at Detroit Michigan

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or whether there was gas, aside from the other interesting findings

DR AUBREY O HAMPTON We have no films of the abdomen. We have just the esophagus and the upper part of the chest. Here are the tubular filling defects that are described. They are spaghetti-like, very irregular, and extend upward almost to the orifice of the esophagus and down to the fundus of the stomach. They involve the esophagus all the way. Even when the esophagus is filled you can see the tubular defects. Here is what appears to be a blood vessel in profile circling in that direction. We did not fill the stomach. I do not see any fluid in the pleural cavity. Here is a shadow that is quite typical of an enlarged spleen. I cannot tell anything about the right side of the abdomen.

DR RICHARDSON The x-ray, then, shows esophageal varices and no fluid in the chest which would suggest that there was probably not a huge amount of fluid in the abdomen although there may be some.

#### DIFFERENTIAL DIAGNOSIS

On reading over this record one would say that there was an obvious diagnosis to make and the whole problem is whether it is too obvious or whether Dr Mallory is giving me an easy case and trying to make me think it is hard. There are certain things about it that are a little bit disturbing. As far as accounting for the vomiting of blood is concerned there does not seem much point in going over all the possibilities. I think we can rule out such curious things as diaphragmatic hernia. I think ulcer is ruled out and cancer would be unlikely. Such a condition as polyp or lymphoma of the stomach which might not show by x-ray is going very far afield in the presence of these varices. So I think we have to assume some condition that is related to dilatation of the veins of the esophagus and also to splenomegaly. The condition which is associated with thrombosis in the splenic veins—we had a case that we discussed about a year ago—is much more frequently seen in children or young adults than it is in a patient of this age. The history apparently goes back about 8 years. We do not know, however, that the epigastric discomfort was necessarily related to this picture. There is no history of alcoholism. She did have an increased cell count. Cases of cirrhosis of the liver with splenomegaly tend to run a low white count, oftentimes even in spite of hemorrhage. There is no evidence of bile retention and we are not at all sure in regard to ascites and that is the difficult thing here. If this is a cirrhotic liver it would account for the esophageal varices. It would explain the 50 per cent dye retention. One would rather think she should have accumulated some fluid in the ab-

domen. If you go looking for other causes of thrombosis the only thing that comes to my mind is polycythemia vera. That is a common cause of thrombosis, usually arterial, I should say, although it might be venous. If you want to try to fit that picture into this case you can say that this patient had a considerable number of hemorrhages that seemed very severe that she responded very quickly, and that she tended to have a high white count. But there is no mention made of platelets and if you had that patient in front of you having bled out I do not see how you could make the diagnosis. So that, to come back to cirrhosis of the liver I should think it was foolish to make any other diagnosis in this case although there are one or two things I do not like about it. I am not prepared to say what type it may be but I shall say it is portal cirrhosis because it is the simplest word I can think of at the moment. With this degree of impairment of circulation I should think that the liver would be small rather than large in the majority of cases. That bothered me a little. Another thing is, can we rely on a liver dye retention test when it gives 50 per cent retention, which in my experience usually means something pretty definite. I think that and the big spleen are against any malignant process. If there is malignancy it must be secondary to some other process. I shall say it is a case of cirrhosis of the liver with esophageal varices and death from hemorrhage.

#### CLINICAL DISCUSSION

DR CHESTER M JONES Dr Richardson has outlined the diagnosis. I should say and I cannot see how there should have been any doubt about it from the first. I followed her through the summer. I first saw her in Maine just after she recovered from a hemorrhage. She had a second one a month later. It was a very curious situation. She had a hemorrhage and the blood pressure never dropped and what Dr Richardson said about her satisfactory blood pressure was quite right. It was always 120-115/80 in spite of a very big hemorrhage. She was kept in the Maine General Hospital for 2 weeks until the hemorrhage stopped and was brought here. About 3 weeks later she had her next and largest hemorrhage and came in to the Baker Memorial at that time. The outstanding feature—and I think it is important in the diagnosis of these cases—was that from the very first in examining her during the hemorrhage you could be sure of two things that could be percussed. In the first place it should have been mentioned that the upper border of the liver dulness was in normal position at the fifth rib. The percussion area was increased and the liver was felt two fingerbreadths down. The other thing which was very easy to make

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 22451

### PRESENTATION OF CASE

A 47 year old Canadian housewife was admitted complaining of hematemesis.

For about 8 years the patient noted epigastric discomfort associated with sour regurgitation. No details relative to these symptoms were noted except that they were successfully treated by diet and alkalies. During the 3 years preceding entry at irregular intervals she suffered seven hematemeses. The vomitus consisted of bright red blood and occurred without apparent provocative cause or warning. The amount of blood varied from a cupful to a half a washbasinful. On two occasions two days of midepigastric discomfort preceded the vomiting. Each time the patient was treated by bedrest, parenteral fluids, and once by a transfusion. Between attacks she enjoyed relatively good health. Repeated x rays failed to show any significant abnormality but splenomegaly was noted. On the morning of entry she had a considerable amount of epigastric discomfort shortly after breakfast and then vomited about two-thirds of a basinful of fresh blood, clots and cereal. The abdominal pain was relieved but she felt faint and weak. The hemorrhage preceding this had occurred 3 weeks before admission.

Physical examination showed a well-developed and nourished, pale, sweating woman with dry, pallid mucous membranes. The heart was not enlarged but a soft systolic murmur was audible at the apex and the pulse was rapid and of poor quality. The blood pressure was reported as satisfactory. The lungs were clear. The abdomen was distended and careful palpation showed the liver to be enlarged two fingerbreadths beneath the costal margin and the spleen was said to be readily palpated although no details were given. An almond-sized node was palpated in the left axilla.

The temperature was 98.6°, the pulse 120. The respirations were 24.

Repeated urine examinations were essentially negative. The specimens contained no bile. The blood showed a red cell count of 3,800,000, with

a hemoglobin of 65 per cent. The white cell count was 13,000, 83 per cent polymorphonuclears. Repeated stool specimens gave positive reactions to the guaiac test on only the first 2 days in the hospital, thereafter they remained consistently negative. The clotting time was 9 to 13 minutes. A sedimentation rate was 20 millimeters in 60 minutes. The van den Bergh test showed 0.45 milligrams of bilirubin and a liver function test showed 50 per cent dye retention in the serum. Clot retraction was normal. The nonprotein nitrogen of the blood was 20 milligrams and the serum protein was 5.3 grams.

An x-ray examination showed numerous tubular filling defects consistent with varices in the lower two-thirds of the esophagus. The stomach and duodenum were negative but the shadow of the spleen was unusually low.

The patient was treated supportively during the next 2 weeks and received several transfusions. Her red blood cell count gradually diminished to 2,400,000 during the first week but subsequently rose to the level at admission. On the fifteenth hospital day a splenectomy was performed and vessels on the lesser curvature of the stomach were ligated. One day later she suddenly vomited 30 ounces of blood and went into shock. This was successfully treated by transfusion and the blood pressure rose to 120/80. On the second postoperative day the temperature fluctuated between 100° and 102°. One week after the operation she again vomited a large amount of blood and, despite supportive measures, failed rapidly and died.

### NOTES ON THE HISTORY

DR. WILMAN RICHARDSON: We have here a history of sudden vomiting of blood for a period of 3 years and of other symptoms that go back perhaps 8 years.

It is my experience in discussing these cases that one cannot say that a liver is enlarged because it is palpable two fingerbreadths below the costal margin. No mention is made of the upper limit of dullness, but I suppose we must presume since the impression was recorded that the liver was enlarged, that some attempt was made to see how high the liver went.

"The white cell count was 13,000, 83 per cent polymorphonuclears." We are not certain when that count was done in relation to the hemorrhage. Presumably it was done immediately after the patient came in.

The great difficulty with the sedimentation rate is that everyone does it a different way and few people bother to correct for the hematocrit. In any case I should say this was a fairly normal figure.

I would be interested to have Dr. Hampton tell us whether there was fluid in the abdomen,

out before the pathologic side is talked about. That is that this patient's two sisters had positive Hintons. You might express some opinion as to whether you think that could conceivably have something to do with the pathology.

DR JONES: We did not get a positive Hinton on the patient's blood. Incidentally, we went over the history before operation to see if we could get a history of abdominal distress at any time to explain splenic vein thrombosis. We were not able to get it.

#### CLINICAL DIAGNOSES

Cirrhosis of the liver  
Splenomegaly  
Esophageal varices

#### DR WILMAN RICHARDSON'S DIAGNOSES

Cirrhosis of the liver (portal?)  
Esophageal varices with hemorrhage

#### ANATOMIC DIAGNOSES

Cirrhoses of the liver, type undetermined  
Portal vein thrombosis acute  
Esophageal varices with perforation and hemorrhage  
Ascites  
Retroperitoneal collateral venous plexus with anomalous left phrenic vein  
Operative wounds. Splenectomy, ligation of left gastric vein

#### PATHOLOGIC DISCUSSION

DR TRACY B. MALLORY: The postmortem on this patient showed, of course, as we expected, a very definite cirrhosis of the liver. The liver was rather coarsely nodular. It was approximately normal in size weighing 1500 grams. I cannot say that it was either large or small. There was nothing in gross or on microscopic examination to give us any definite lead as to what the etiology might be. The spleen, as you have heard, had been removed and the portal system of veins was naturally the focus of our interest and attention. One of the major dangers of splenectomy in cases either of thrombosis of the splenic vein or cirrhosis of the liver is the likelihood of development of acute thrombosis somewhere in the portal area postoperatively. There was no clinical indication of that in this case but we did find a large fresh thrombosis starting in the portal vein at just about the junction of the splenic and superior mesenteric veins almost completely occluding the portal vein and its two primary branches of the liver. To what extent death was due to this thrombosis or due to the final terminal hemorrhage from the varices which we also found I am not sure. I imagine both elements played a rôle.

As Dr. Allen described, there was a very com-

plexed collateral circulation in this case which I do not believe we more than began to unravel. The most striking feature of it was a very marked dilatation of the left phrenic vein. That is ordinarily such a small vessel that it would never be noticed in the course of routine post-mortem examination, probably hardly be noticed in surgical operations, but in this case it was a very significantly large vessel. Under ordinary conditions the right phrenic vein empties into the cava, the left into the left renal vein. In this case the left phrenic entered the left ovarian vein which meant a difference of one half or three quarters of an inch in its usual spot of insertion. There were a great many other dilated vessels in the immediate neighborhood which are normally so small that they lie way beyond the realms of nomenclature. The question has come up as to whether an attempt to tie that vessel would have done any good. To my mind it would have been inadvisable because it seems as though its function must probably have been partially to drain the varices and to return at least part of the blood in them to the cava. In other words, the flow of blood in the vein was probably away from the esophageal varices.

How do you feel about it, Dr. Allen?

DR ALLEN: In this article which I mentioned that point is brought out. I think that is perfectly true and because we did not know whether it would do good or harm we left it, fortunately. This is a fairly rare anomaly apparently, as Dr. Simond's report includes one case of his own and six from the literature.

DR JONES: I should like to add one suggestion. It seems to me we have taken Banti's disease and used it as a wastepaper basket for a lot of queer cases with large spleen and cirrhosis of the liver. Banti's disease was originally described as thrombosis of the splenic vein. It may be that there is a certain form of cirrhosis of the liver secondary to such a vascular accident. This case may be of such a nature. It is not entirely comparable to what is called alcoholic cirrhosis, that is portal cirrhosis associated with heavy drinking and so forth. It may be that this sort of vascular network is not present when the disease is primarily intrahepatic. One might hook some of these cases where the whole vascular venous system is interfered with with those that fall into the group of Banti's disease. That term at present really means nothing except spleen, liver and portal system disease.

#### CASE 22452

#### PRESENTATION OF CASE

A 55 year old English housemaid was admitted complaining of nausea, vomiting and constipation.

out by percussion, was what seemed to be a very large spleen. I suppose it could have been something else. When these cases of bleeding come into the hospital we do not want to examine the abdomen except superficially. Percussion at times ought to make a diagnosis. We have had at least 3 cases this year where diagnosis was made by percussion. We found a large spleen by that means and then came to the conclusion that we were probably dealing with cirrhosis of the liver rather than ulcer or cancer or something of that sort. The spleen therefore could be percussed and was easily palpated. She had some fluid in the abdomen. The abdomen was doughy. Another interesting point was that in going over the history it was absolutely impossible to get a story of a preceding cause for cirrhosis. There was no history of alcohol, no infections of any sort, and she was never jaundiced. Another point that at least interested me was that she had gone 4 years having one hemorrhage after another which is a rather long time for a case of cirrhosis of the liver to go. I think we had one patient, an old alcoholic, that has been on the ward ten or fifteen times over a period of 12 years with bleeding. He undoubtedly has some change in the liver, which is in the nature of a cirrhosis. I think, however, his bleeding may have been due to an acute exacerbation of chronic gastritis which I think does cause bleeding at times. Such a diagnosis should not be made until everything else is ruled out. The varices in the case under discussion are much more striking than in most of the pictures we see in this hospital. They are usually not seen under the fluoroscope. It is also true that in this instance the varices went up higher in the esophagus than usual.

We put the situation up to the family because one could see that the patient would most certainly die of hemorrhage if nothing were done. For that reason I asked Dr. Allen to consider a difficult technical procedure, hoping we might be able to cut off enough blood supply to the esophagus to at least temporarily—and by temporarily I visualized a year or so, possibly longer—cut down the number of hemorrhages which were increasing in frequency. It was admittedly a rather desperate attempt and everybody realized that before operation. We all felt that the diagnosis was pretty clear.

DR ARTHUR W ALLEN. Quite a number of years ago Dr. Judd suggested the possibility of splenectomy to reduce hemorrhage from esophageal varices. This was afterwards taken up as a study by Walters who demonstrated the actual amount of blood flow by injecting specimens through the splenic vessels that is where the blood actually went in relationship to the portal vein whether it was obstructed or not. From this it was obvious that a very large proportion

of the blood which has to go through the esophageal veins can be reduced if you remove the spleen and also ligate the vessels along the lesser curvature of the stomach. Several years ago we had a boy come into the medical wards with repeated gastric hemorrhages. He had been treated at the Children's Hospital some time before but having reached the age of 12 he came to us, and on the basis of this work of Walters and Judd a splenectomy was done. The boy was all right for a year and then bled again and came back. At that time he was esophagoscope—it was before we could diagnose esophageal varices readily by x-ray—and varices were found in the esophagus. So that another operation was done to interrupt the vessels on the lesser curvature of the stomach, and later by esophagoscope it was obvious that the veins had been greatly reduced in size. He had one hemorrhage a year later and since then has been all right. He was traced less than a year ago and we found that he had had no hemorrhages for the past 6 or 7 years.

It was on the basis of the possibility of being able to interrupt a considerable portion of the blood flow through the esophageal varices that this operation on this patient whom we are discussing today was finally undertaken. The spleen was large, as shown in the x-ray, somewhat adherent, but not very difficult to remove. There were perhaps no more than normal extra vessels in the form of vasa brevia, and so forth that you get between the spleen and the fundus of the stomach and the vessels along the lesser curvature of the stomach were not enlarged. We knew that and it did not disturb us particularly, because in the other case I spoke of they were not enlarged, but we found other conditions which were very interesting to us and which we realized meant that probably this operation in this instance would not be successful. After getting the spleen out of the way we found a perfectly enormous plexus of veins practically amounting to a cavernous hemangioma lying behind the spleen above the pancreas. We could see an enormous vein going along the diaphragm, a vein as large as my finger and we felt that we could not safely interrupt that. We did not know exactly where it came from or where it was going so we did not attempt to do anything about it. So we were not surprised when she continued to bleed.

In the September 1936 issue of the *Archives of Surgery* there is an article by Dr. J. P. Simonds of Chicago entitled "Chronic Occlusion of the Portal Vein" that describes the condition which we found in this patient. If any of you care to read it I think it would answer the whole question. I think Dr. Mallory will say that what he found will correspond pretty accurately with the drawing shown in that article.

There is one question I would like to bring

for a matter of over two weeks and complete for a week. She must have been absorbing some of her fluid intake

It is very interesting to have such a leisurely pulse rate in a patient with acute obstructive symptoms for a considerable time

One thing you can get from the laboratory findings is that she has surprisingly little anemia—4,300,000 is a pretty good red count—and perhaps some loss of color index. The white count and temperature might indicate an inflammatory process or disturbance of the vascularity of the bowel although neither one of them is high enough to justify the assumption that we are dealing with gangrenous intestine. The pulse of 80 is very difficult to reconcile with anything involving gangrene of the intestinal tract

It sounds to me as if the radiologist was attempting to describe in very objective terms an intestinal intussusception. Will you elucidate your picture?

DR. RICHARD SCHATZKI: Here is the view of the first plain film obtained several days before admission to the hospital. The ascending colon and transverse colon are filled with air and slightly dilated, certainly not very much so. This is the plain film on the day of entrance and you see now a definitely dilated cecum, fecal filled hepatic flexure and markedly dilated transverse colon with a peculiar end, as well as distention of the small intestine. Dr. Petersen did the enema. He saw a complete stop in the descending colon about six inches below the splenic flexure. The end of the block was very smooth and, as you heard in the report, the bowel seemed to be a little larger in that region than it was in the colon below. There were several reasons which prompted us not to be satisfied with the diagnosis "obstruction by tumor" but to try to analyze the picture further. First there was the unusual smooth border of the obstructing mass, secondly, the increased size of the colon just in the region of the obstruction, thirdly, the unusual appearance of the soft tissue proximal to the region of the obstruction. These changes extended from the area of obstruction in the descending colon up into the transverse colon. The marked dilatation of the colon by air stopped within the transverse colon. There was apparently pathology beginning in this region and extending along the splenic flexure in the descending colon. If one would explain all changes by tumor itself, one would have to assume a tumor which runs around the splenic flexure in other words a "bending" tumor. Dr. Mallory will probably say that this may occur but I think it is very unusual.

DR. TRACY B. MALLORY: It is pretty uncommon.

DR. SCHATZKI: Here is another film showing

the soft tissue mass in the region of the splenic flexure containing a narrow air channel much narrower than that of the dilated colon proximal to it. All these signs together caused us to make our final diagnosis.

DR. TAYLOR: This is a very interesting picture and a very ingenious interpretation undoubtedly, but we have not the benefit of their point of view. Certainly we have virtually complete intestinal obstruction of two weeks' duration or thereabouts and localized by the x-ray to the distal half of the transverse colon and the upper part of the descending colon. It seems to me that our chief interest from the surgical viewpoint is to know whether we are dealing with a simple mechanical obstruction or whether we also have impairment of the blood supply of the bowel wall. She is surprisingly well on physical examination for somebody who has gangrene or strangulation of the intestine. In favor of gangrene would be perhaps the very sharp abdominal pain she had before entry, the white cell count and the renewed intensity of vomiting which occurred the day before, and some temperature. On the other hand she had negligible local abdominal findings except for slight tenderness and distention. She has not beginning peritonitis certainly, at least it is not obvious. It would be well to know if they could hear a peristaltic rush consistent with obstruction, or whether she had a silent bowel. She is not completely dehydrated. Her pulse rate is slow. All these things are against a gangrenous process in the bowel considering the fact that her symptoms have been going on for so long. I do not think we need to go into very many possibilities in the light of our x-ray note. As Dr. Schatzki has pointed out it is unusual to see malignancy going around the corner and shaping itself to the normal course of the intestine. Against malignancy, also, is the fact that she has had no bleeding at any time, and that she has for years had some obstruction of the gastrointestinal tract which has been mild, and the acute exacerbations were of relatively brief duration. The anemia also is not in keeping with that which you would expect to find from malignancy of the colon which had progressed to the point of obstruction.

Intussusceptions are unusual in this part of the bowel unless they are precipitated by some benign lesion inside the bowel or possibly favored by the presence of some extrinsic pathology. I think if we assume she has an intussusception, as the x-ray facts suggest it would be reasonable to assume the existence of a benign tumor as causative of the intussusception. I do not see how we can account for the obstruction on the basis of any other of the usual causes, such as volvulus, foreign body in the lumen of the intestine or obstruction due to extrinsic causes. I bank on all this being intus-

For several years the patient had suffered frequently from weak spells, nausea, gaseous eructation, aching pain in various portions of the body, and numbness of the extremities. Occasionally there was abdominal distention and vomiting. These symptoms usually occurred, according to the patient, after dietary indiscretions and she limited her diet frequently to clear broth and bread. She had been examined a number of times in the Outpatient Department and no diagnosis of organic disease had been established. About two and a half weeks before entry the patient fell and sustained several contusions but had no evident serious injury. Two days later she developed constipation, gaseous eructation, and occasional attacks of nausea and vomiting. These were more severe than the symptoms previously experienced and she eventually was unable to retain either liquids or solids. Subsequently she developed a sense of abdominal distention and had vague colicky pains in various portions of the abdomen. During the succeeding week the constipation progressed to the point where an enema was necessary to produce a bowel movement. Vomiting following the ingestion of food became constant and obstipation ensued about one week before entry. There was no flatus but frequent and voluminous gaseous eructation served to relieve her abdominal distention. A plain x-ray film of the abdomen at this time showed a large amount of gas in the transverse and ascending colons and some gas in the small bowel, which was not dilated. The kidneys were negative and a Graham test was unsatisfactory. The day before entry the symptoms abated temporarily but following a single spoonful of food she was seized with severe generalized abdominal pain and the nausea and vomiting returned. A physician administered a sedative and advised her to enter the hospital. The patient stated that she had lost about eight pounds in the two weeks preceding entry. There had been no melena or hematemesis.

Nineteen years before admission the patient had been operated upon for a tubal pregnancy and the right tube and ovary and the appendix were removed.

Physical examination showed a slender, pallid, apprehensive middle-aged woman gagging frequently and attempting to vomit. Occasionally she succeeded in raising small amounts of frothy, slimy material. The skin was cool and the tongue moist. The heart was normal and the lungs clear. The abdomen was slightly distended and tympanic. Slight nonlocalized tenderness was elicited but there was no spasm, rigidity, or masses. Rectal and vaginal examinations were negative.

The temperature was 99.8°, the pulse 80. The respirations were 20.

Examination of the urine was negative. The blood showed a red cell count of 4,300,000, with a hemoglobin of 65 per cent. The white cell count was 16,300.

Another plain film of the abdomen now showed a large amount of gas in the dilated transverse colon and considerable gas and fecal material in the ascending colon. The gas in the transverse colon stopped abruptly just proximal to the splenic flexure. The small bowel was slightly dilated and also contained considerable gas. A barium enema showed that the column flowed to a point about 6 centimeters above the left iliac crest where it met complete obstruction. The obstructing end of the mass was convex and bulged into the lumen of the bowel. It appeared to have a slightly larger diameter than the bowel just below it. In the left upper quadrant overlying the eleventh rib there was a doughnut-shaped shadow with a central mottled area of decreased density and the end of the gas-filled transverse colon was seen to project into this circular shadow. Between the circular shadow and the obstructing mass below there was a hazy, somewhat indefinite tubular shadow.

Shortly after entry a laparotomy was performed.

#### DIFFERENTIAL DIAGNOSIS

DR GRANTLEY W. TAYLOR: I think it is worthwhile to review the history of the illness briefly. What had been going on for several years in the way of distention, vomiting and gaseous eructation was apparently tolerable to the patient. We might raise the question of biliary tract disease, which often would explain these symptoms, but the patient was apparently willing to attribute them to dietary indiscretions and had worked out a mode of coping with the problem when it arose.

Two and a half weeks before she came in she had a fall and immediately following this she developed a more marked attack than she had had before, with pain, distention, constipation and vomiting which became progressively more severe. Where she was all that time, I do not know. They were willing to take an x-ray examination but apparently they did not feel that she was sick enough to warrant sending her right into the hospital. The x-ray film showed a good deal of intestinal distention, especially in the colon. The day before she came in she had severe abdominal pain, which sent her into the hospital, and more nausea and vomiting. The loss of eight pounds simply reflects the fact that she had been taking practically nothing by mouth and was vomiting everything she took.

"The skin was cool and the tongue moist." That is very interesting in connection with an apparent obstruction that has been going on

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## KEEPING "PROFESSIONALLY FIT"

A DIPLOMA from a medical school and registration by a state licensing board are together no absolute guarantee that a physician will conduct his practice of medicine in a way that is most advantageous to his patients to the community as a whole and to himself. While it is true that the physician learns a great deal about diagnosis and therapy through the routine of practice the present rate of advance of medical knowledge is so rapid that it becomes impossible for him, as years go by, to apply correctly a great part of the knowledge acquired during his medical school years. His position is analogous to that of one endowed by nature with a superb physique, the finer points of which will rapidly disappear unless successful attempts are made to keep "physically fit." The physician likewise, must make an effort to keep abreast of the times—to keep "professionally fit."

To those who are fortunate enough to be on the faculties of medical schools and on the staffs of moderately sized or large hospitals the problem is relatively simple. Teaching activities

staff meetings consultations and the like all demand, and frequently furnish, the newer medical facts. But the physician without such associations lacks the stimulation required by teaching and the instruction gained by contact. Unless intelligent diligent and honest efforts are made to master the more important current contributions to medical science, he gradually falls behind and becomes "professionally unfit."

How can the busy practitioner best retain 'professional fitness'? Enrollment in regular postgraduate courses of instruction is too time-consuming and costly for the majority. Extension courses, such as those sponsored by the Massachusetts Medical Society, are excellent, but are naturally very limited in the amount of ground that can be covered. Medical books, particularly the so called "systems", are satisfactory if kept up-to-date by new editions or supplements but expensive. Medical journals and district and state medical society meetings are the agencies on which the physician is most dependent. Unfortunately such articles and addresses are too frequently of little value to the practicing physician. He should be interested neither in the reports of progress in experimental and research medicine nor in the therapeutic results of new, but relatively untied, therapeutic agents, however brilliant they may be. What he needs and should demand are authoritative papers and talks in which the known facts concerning the etiology and course of disease and the tried and approved methods of treatment are simply and clearly reviewed. Literature released by the Massachusetts Department of Public Health such as that concerning the Massachusetts Cancer Program, is of inestimable value, but narrow in scope.

Assuming that extension courses are available, that up-to-date books are at hand, that the contents of articles and talks are proper and that appropriate literature is furnished by an active state health agency, no alibi for "professional unfitness" remains. While it is true that these facilities are not available to all and that many opportunities are presented that are of little value to the practicing physician, the means of keeping 'professionally fit', in one form or another, is within the reach of all and failure to seize the opportunity is evidence of an inexcusable lack of responsibility on the part of the physician.

At present such "professional fitness" is a purely personal matter, but at some future date it may be demanded by a public that is becoming more and more educated in medical matters. It is true that a large proportion of those who eventually allow themselves to become "professionally unfit" could and should be eliminated by stricter regulations regarding approved medical schools and by more exacting examina-

susception due to a preexisting benign tumor. Whether we will find gangrene of the bowel I cannot say, but my impression would be that we will not.

DR WALTER E GARREY: This case presents a number of very interesting decisions, the most important of which Dr Taylor put his finger on when he said we had to decide whether the blood supply was impaired or not. Dr Taylor wondered where she was during the interval after the fall, when she was vomiting. She was visiting various clinics. First the orthopedic and then the neurologic and medical for vomiting, and eventually she found her way to the Accident Room where, in reviewing the record, it seemed to the men who admitted her that it represented neurotic vomiting, but they were suspicious enough to keep her in the hospital. The next morning when I saw her for the first time the abdomen was distended and auscultation showed rushing, gurgling peristalsis. It was then that the second plain abdominal film showed gas in the right colon and transverse colon. We then promptly had a barium enema which Dr Schatzki and Dr Petersen diagnosed as intussuscepted tumor with obstruction. We operated on her that same afternoon. Under spinal anesthesia we made a small right lower quadrant incision and put a hand across in the area of the splenic flexure where a cuff like fold was felt which we thought was intussusception, and below that, in the upper descending colon, was felt a walnut-sized tumor. We thought we were dealing with an intussuscepted tumor. The decision had to be made whether we should merely alleviate the obstruction by cecostomy—the right colon was edematous and there was some fluid in the abdomen—or whether because of fear of impaired blood supply to the intussusception we should go farther and attempt reduction and be prepared to do a resection in the presence of an acute obstruction, a procedure which would necessitate considerable risk. We decided that the blood supply was not impaired and the safest thing to do was a cecostomy. Ten days later we operated and found an area of descending colon and splenic flexure entirely free from pathology on first inspection. However, just to the left of the midline was a little frosting on the serous surface of the transverse colon, evidence of trauma to the visceral peritoneum at that point. Within the bowel in the middle of that area, a dome-shaped tumor could be palpated the base of

which was the size of a twenty-five cent piece, arising from the anterior wall and not nearly completely obstructing the lumen of the bowel at that time. There was no intussusception at that time. We felt it was a broad based adenomatous polyp, at least potentially malignant, and therefore, and because of previous trouble with intussusception, that it ought to be removed. We did a resection and an aseptic end-to-end anastomosis by the Parker-Kerr method following which she did very well.

#### PREOPERATIVE DIAGNOSES

Acute obstruction of the colon  
Carcinoma of the left colon

#### DR GRANTLEY W TAYLOR'S DIAGNOSIS

Pedunculated benign tumor of the colon producing intussusception

#### PATHOLOGIC DIAGNOSES

Submucous lipoma  
(Intussusception)  
Melanosis coli

#### PATHOLOGIC DISCUSSION

DR MALLORY: By the time of resection the intussusception, as you have heard, had reduced itself but the mucosa of the bowel was still reddish black so that we may assume there had been a considerable degree of circulatory obstruction, though not enough to produce gangrene. The cause of the intussusception was, as predicted, a benign tumor, in this instance a lipoma arising in the submucosa of the intestinal wall. In retrospect I think it is probable that her difficulties over the entire twenty-year period were probably all dependent upon the tumor which is undoubtedly slowly growing and must have been present over a long period of time.

DR TAYLOR: I meant to speak of the injury as possibly producing the intussusception. I do not know enough about it to decide whether that is a reasonable assumption, but a fall such as she suffered might have caused the violent prolapse or motion of that tumor to start intussusception. However, there was an interval of two days between the fall and the onset of the symptoms.

DR GARREY: I should also have said we very carefully palpated the remainder of the colon and found no polyps. We palpated the gall-bladder and found no gallstones.



body and soul, since they need often to render them spiritual as well as physical aid. Religion and medicine are complementary forces for good and the physician should not be content merely to combat the diseases of the body. It is his duty to share in the universal conflict between the forces of organized good and organized evil. His should be the human touch which makes the whole world kin. "A kindly word spoken in season by the understanding physician will frequently bring more relief to a distressed mind or body than a pill or potion, the knife, or an elaborate psycho-analysis." From the days of Sir Thomas Browne it has been realized by the thoughtful that physicians, as a profession, are not irreligious, that science and religion are not incompatible, in spite of popular impression to the contrary. As examples of firm religious conviction among physicians and other men of science, Dr. Finney cited Sir Isaac Newton, Lord Kelvin, Louis Pasteur, Sir William Osler and Dr. Oliver Wendell Holmes. He might have added also Holmes's successor, Dr. Thomas Dwight, from whom many of the older physicians of our community learned not only the anatomy of the human body but the dignity of the human soul.

It is gratifying that so large a number of practitioners and students of medicine attended this service not only as an evidence of respect to Dr. Finney but as testimony to their conviction of the truth of the doctrine which he presents. The physician need not fear to be religious, and should possess the moral courage to testify, profess, and practice the faith which is in him.

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

LANE, C. GUY, A.B., M.D. Harvard University Medical School 1908. Lecturer in Dermatology, Harvard University Medical School. Chief, Dermatological Department, Massachusetts General Hospital. Consultant in Dermatology, Huntington Memorial Hospital, New England Deaconess Hospital and United States Veterans' Hospital. His subject is "Occupational Skin Disease—A Preventable Disease and a Challenge to Modern Preventive Medicine." Page 859. Address 416 Marlborough Street, Boston, Mass.

BLOTNER, HARRY, A.M., M.D. Tufts College Medical School 1924. Associate in Medicine, Peter Bent Brigham Hospital. Instructor in Medicine, Harvard University Medical School. Consultant to the Haverhill Municipal Hospital and the Weymouth Hospital. His subject is "The Effect of Protamine Insulfate on the Blood Sugar Level Including Intravenous Use

in Rabbits." Page 865. Address 23 Bay State Road, Boston, Mass.

DUBOIS, EOLINE, CHURCH, M.D. Tufts College Medical School 1903. Member of Springfield Health Council. School Physician, Springfield. Associate Physician, Wesson Hospital, Springfield. His subject is "Living With a Colostomy." Page 869. Address 17 1/2 Buckingham Street, Springfield, Mass.

HOWE, BYRON E., M.D. University and Bellevue Hospital Medical College 1918. F.A.C.S. Chief of Surgical Staff, W.B. Plunkett Memorial Hospital, Adams, Mass. Member of Courtesy Surgical Staff, North Adams Hospital, North Adams, Mass. His subject is "Report of a Case of Gas Bacillus Infection Occurring in a Wound Following an Operation for Chronic Appendicitis." Page 871. Address 6 Center Street, Adams, Mass.

### The Massachusetts Medical Society

#### FOURTH ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning November 9

##### Barnstable

Sunday, November 15 at 4:00 p.m. at the Cape Cod Hospital, Hyannis. Subject: The Prognosis of Heart Disease. Instructor: R. S. Palmer. John I. B. Vail, Chairman.

##### Berkshire

Thursday, November 12 at 4:30 p.m. at the House of Mercy Hospital, Pittsfield. Subject: Acute Abdominal Emergencies. Instructor: R. R. Linton. Melvin H. Walker, Jr., Chairman.

##### Bristol North

Thursday, November 12 at 4:00 p.m. at the Vorton Hospital, Taunton. Subject: Anesthesia. (a) Drugs in Anesthesia. (b) General Care of Patient in Anesthesia. Instructor: P. D. Woodbridge. Arthur R. Crandell, Chairman.

##### Bristol South (Fall River Section)

Monday, November 9 at 4:00 p.m. at the Stevens Clinic of the Union Hospital, Fall River. Subject: Heart Disease. Treatment of Cardiovascular Emergencies. Instructor: R. E. Glendy. Howard P. Sawyer, Co-Chairman.

##### Bristol South (New Bedford Section)

Friday, November 13 at 4:00 p.m. at St. Luke's Hospital, New Bedford. Subject: Heart Disease. Treatment of Cardiovascular Emergencies. Instructor: Sylvester McGinn. Robert H. Goodwin, Co-Chairman.

tions by state licensing boards,\* particularly in regard to the individual traits and characteristics that are essential to the conscientious practice of medicine. Nevertheless it does not seem unreasonable to postulate that, in the future, re examination at stated intervals, such as that required of the doctors of the United States Army and Navy and that recommended for the members of at least one of the recently organized "specialty" medical associations, may be suggested

### THE BRATTLEBORO RETREAT

SHORTLY after 1800, the Honorable Richard Whitney of Brattleboro, Vermont, began to show symptoms of mental disease. He was treated by being held under water for a number of minutes until he was almost suffocated, with the hope that such a profound shock to his nervous system would cure him of his malady. Needless to say, a cure was not effected by this drastic procedure and the patient had to be closely confined until death released him, in 1806, from his suffering. The illness of this well-known patient brought to the mind of Mrs. Anna Marsh, the widow of Dr. Perley Marsh of Hunsdale, New Hampshire, the necessity for suitable accommodations for the care of the insane. She, therefore, in drawing her will in 1834, left a considerable sum of money to found a hospital for this purpose. Thus, one hundred years ago, were the beginnings of the Brattleboro Retreat at Brattleboro, Vermont. At the time it was founded there were only ten hospitals in this country for the care of patients with mental disease. Three of these were in New England: the McLean Hospital, then at Somerville but now in Waverley, Massachusetts, the Hartford Retreat in Hartford, Connecticut, and a hospital in Worcester. The move on the part of Mrs. Marsh was a natural one, tempered to the times. Only a decade or so before her time, the care of the insane was in large part conducted by those not in the medical profession. The problem was considered one of theology and law and this idea still persists even to the present day.

Due to the sound example set by hospitals such as the Brattleboro Retreat, in the last one hundred years, insanity has come under the care of physicians, where it rightfully belongs. The Brattleboro Retreat has been one of the outstanding hospitals in this country, always upholding the highest standards of medical practice. It has grown from a single house with accommodations for about twenty patients to its present extensive location with beds for seven hundred patients. Four superintendents, including the present incumbent, Dr. Horace G. Ripley, with the aid of an intelligent board of trustees, have carried this institution to its high

place in the medical world today. It is certainly second to none in equipment and staff. *The New England Journal of Medicine* extends its heartiest congratulations to the Brattleboro Retreat on its centennial.

### SPECIFIC TREATMENT FOR LOBAR PNEUMONIA

WHETHER or not an explanation can be offered for changes in mortality rates, there is usually a group of individuals who interest themselves in the particular problems of each disease. They formerly made much of what were called "educational" factors. The spectacular drop in tuberculosis mortality rates has become indelibly associated in the minds of the public with a vague biologic integrity which is somehow predicated by sleeping with the windows open and a daily movement of the bowels. We have even had a President who fought his way to health by deep breathing exercises! That was before the days of collapse therapy.

The Pneumonia Committee of the Boston Health League, a communication from whom appears on page 890, does not permit itself the luxury of explaining a drop of approximately fifty per cent in the pneumonia death rates in Massachusetts during the past fifteen years. The members of this committee know it would be a mistaken assumption to explain this change in terms either of prevention or treatment, although both the case rate and the fatality rate have been reduced. They have been content to point out from time to time the available resources for physicians in giving the best possible treatment to pneumonia patients in the City of Boston. A continuation of this service is to be hoped for.

### CHURCH SERVICE FOR PHYSICIANS

APPROPRIATELY on the evening of Saint Luke's day, Sunday, October 18, a special service for physicians and medical students was held in the Cathedral Church of Saint Paul in Boston under the auspices of a committee of twenty physicians, headed by Dr. J. Howard Means as Chairman. The church was well filled, and among the congregation might be recognized many well-known physicians of the city. The lessons of the day were from Ecclesiasticus, xxxviii,—"Honor a physician with the honor due unto him",—and from the parable of the Good Samaritan in Saint Luke's Gospel.

Bishop Sherrill gave an address of welcome in which he emphasized the close affiliation which exists between the two professions of ministry, between the clergy and the physicians.

The principal address was by Dr. J. M. T. Finney of Baltimore. Dr. Finney pointed out that physicians should treat their patients both

to obtain at least a teaspoonful of sputum which is collected in a clean wide mouthed bottle or cardboard sputum box, and to send it at once, preferably by messenger to the nearest laboratory equipped for typing. Special containers are available through local boards of health. No antiseptic should be added to the sputum. Tuberculosis sputum outfits should not be used as they contain carbolic acid.

The Neufeld method of typing is rapid, simple and reliable and has supplanted other methods. It is applicable to pneumococci from any source and often permits identification of type within a few minutes.

Typing will be done without charge at the State Bacteriological Laboratory, Room 527 State House, Boston. In case of emergency typing of sputum from patients for whom serum therapy is applicable will be done during the night, week-ends or on holidays. Such specimens should be left with the State House Guard. All sputums showing Type I or Type II pneumococci are reported by telephone or telegraph prepaid.

In addition to the State House Laboratory typing facilities are available elsewhere. The charges for the typing depend on the laboratory. Typing in Boston is done at the following hospitals: Boston City, Faulkner, Evans, Department of the Massachusetts Memorial and the New England Deaconess.

Elsewhere in the State facilities have been established for pneumococcus typing in 59 laboratories: 16

Attleboro Sturdy Memorial Hospital  
Ayer Ayer Community Memorial Hospital  
Beverly Beverly Hospital  
Brockton Board of Health Laboratory  
Brockton Brockton Hospital  
Cambridge Cambridge Hospital  
Cambridge Cambridge City Hospital  
Chelsea Chelsea Memorial Hospital  
Clinton Clinton Hospital  
Everett Whidden Memorial Hospital  
Fall River Fall River General Hospital  
Fall River St. Ann's Hospital  
Fall River Truesdale Hospital  
Fall River Union Hospital  
Fitchburg Burbank Hospital  
Framingham Framingham Union Hospital  
Garner Henry Heywood Memorial Hospital  
Gloucester Addison Gilbert Hospital  
Great Barrington Fairview Hospital  
Greenfield Franklin County Hospital  
Haverhill Gale Hospital  
Holyoke Holyoke Hospital  
Holyoke Providence Hospital  
Hyannis Cape Cod Hospital  
Lawrence Lawrence General Hospital  
Leominster Leominster Hospital  
Lowell Lowell General Hospital  
Lowell St. John's Hospital  
Lowell St. Joseph's Hospital  
Lynn Lynn Hospital  
Walden Walden Hospital  
Marlboro Marlboro Hospital

Milford Milford Hospital  
Natick Leonard Morse Hospital  
New Bedford St. Luke's Hospital  
Newburyport, Anna Jaques Hospital  
Newton Newton Hospital  
North Adams North Adams Hospital  
Northampton, Cooley Dickinson Hospital  
Norwood Norwood Hospital  
Palmer Wing Memorial Hospital  
Peabody J. B. Thomas Hospital  
Pittsfield House of Mercy Hospital  
Pittsfield St. Luke's Hospital  
Plymouth Jordan Hospital  
Pocasset Barnstable County Hospital  
Quincy Quincy City Hospital  
Salem Salem Hospital  
Southbridge, Harrington Memorial Hospital  
Springfield Springfield Hospital  
Springfield Mercy Hospital  
Springfield Wesson Hospital  
Taunton Norton Hospital  
Ware Mary Lane Hospital  
Westfield Noble Hospital  
Worcester St. Vincent's Hospital  
Worcester Worcester City Hospital  
Worcester Worcester Hahnemann Hospital  
Worcester, Worcester Memorial Hospital

#### SPECIFIC SERUM FOR TREATMENT

Specific serum for the treatment of Type I or II pneumococcus pneumonia is available to physicians through the State Laboratory, Room 527 State House, Boston, or through the laboratories of any of the hospitals listed above, provided that:

- (1) Sputum or other material from the patient is first typed and found to contain Type I or II pneumococci.
- (2) The physician certifies that the patient has not been ill longer than four days (96 hours).
- (3) As soon as the patient is discharged, the physician agrees to make a report to the Massachusetts Department of Public Health on a form enclosed with the serum.

Under these conditions 60,000 units of concentrated serum (Felton's antibody solution) will be issued for each Type I pneumonia and 100,000 units for each Type II case.

Bacteriemia occurs in about one-quarter of the cases with Type I and one-third of those with Type II pneumococcus pneumonia and is a very serious condition. Thus information in relation to bacteriemia is of great importance in treatment. It is desirable to make a blood culture in each case before the first dose of serum is given. If the first blood culture is positive or if negative and the progress of the case is unsatisfactory, it is desirable to continue to take blood cultures at intervals of about twenty-four hours. Blood cultures may be sent for examination to the State Bacteriological Laboratory.

Experience has shown that some cases require

**Essex South**

Tuesday, November 10 at 4 00 p m, at the Salem Hospital Salem Subject Blood Diseases Diseases Affecting the White Blood Cells Leukemias, Agranulocytosis Mononucleosis Instructor G S FitzHugh Walter G Phippen Chairman

**Franklin**

(Course omitted this week on account of Armistice Day)

**Hampden**

Thursday, November 12, at 4 00 p m at the Academy of Medicine Professional Building 20 Maple Street Springfield and at 8 30 p m, in the Outpatient Department of the Skinner Clinic Holyoke Hospital, Holyoke Subject General Consideration of Newer Aspects of Obstetrics and Pediatrics from the Viewpoint of the General Practitioner Instructors M V Kappius and S H Clifford. George L Schadt and George D Henderson, Chairmen

**Hampshire**

(Course omitted this week on account of Armistice Day)

**Middlesex East**

Tuesday November 10 at 4 00 p m, at the Melrose Hospital Melrose Subject Blood Diseases Diseases Affecting the White Blood Cells Leukemias Agranulocytosis Mononucleosis Instructor C S Keefer Joseph H Fay Chairman

**Middlesex North**

Friday November 13 at 7 00 p m, at St Joseph Hospital Merrimack Street Lowell Subject Heart Disease Treatment of Cardiovascular Emergencies Instructor S A Levine Samuel A Dibbins Chairman

**Middlesex South**

Tuesday November 10, at 4 00 p m at the Cambridge Municipal Hospital Cambridge Subject Heart Disease Treatment of Cardiovascular Emergencies Instructor H B Sprague Edmund H Robbins Chairman

**Norfolk**

Friday November 13 at 8 30 p m at the Norwood Hospital Norwood Subject Blood Diseases Diseases Affecting the White Blood Cells Leukemias Agranulocytosis Mononucleosis Instructor W B Castle Hugo B C Riemer Chairman

**Norfolk South**

Monday November 9 at 8 30 p m at the Quincy City Hospital, Quincy Subject Arthritis Diagnosis and Treatment Instructor H A. Nissen David L Belding Chairman

**Plymouth**

Tuesday November 10 at 4 00 p m, at the Brockton Hospital, Brockton Subject Lung Disease Pneumonia and Its Complications Diagnosis and Treatment Instructor Rod erick Heffron W H Pulsifer Chairman

**Worcester (Milford Section)**

Thursday, November 12 at 8 30 p m, in the Nurses Home of the Milford Hospital, Milford Subject Blood Diseases The Hemoglobin and Red Blood Cells in Relation to Disease Instructor W P Murphy Joseph Ashkins, Sub Chairman

**Worcester North**

Friday, November 13 at 4 30 p m, at the Burbank Hospital, Fitchburg Subject Psychiatry (a) Psychobiology in General Medicine (b) The Common Neuroses Instructor H C Solomon Edward A Adams, Chairman

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## MISCELLANY

**SPECIFIC TREATMENT FOR LOBAR PNEUMONIA**

As the season of increased prevalence of lobar pneumonia approaches it seems desirable again to call attention to certain matters pertaining to the disease the importance of the recognition of types of pneumococcus infection and the application of specific treatment

Lobar pneumonia is the seventh leading cause of death in Massachusetts Type I or Type II pneumococci are the cause of the disease in over one half of the cases

The case fatality rate of Type I pneumococcus pneumonia untreated with serum is approximately 25 per cent and of Type II 41 per cent The expected death rate in these two types can be much reduced by early specific treatment Of 645 Type I cases in the Massachusetts Pneumonia Study which were treated with serum within the first four days of the illness only 73 or 11.3 per cent died Of 167 Type II cases similarly treated 39 or 23.4 per cent died This experience in Massachusetts has demonstrated that specific treatment can be successfully used by physicians in general practice

Success in specific treatment depends for the most part upon the early use of serum Thus the type of pneumococcus infection should be determined at the earliest possible moment The importance of the time element is emphasized by the experience in Massachusetts Of 506 Type I cases treated during the first three days 46 died (9.1 per cent) and of 139 treated on the fourth day 27 died (19.4 per cent)

**DETERMINATION OF TYPE OF PNEUMOCOCCUS INFECTION**

The type of infection is more readily determined by examination of the sputum than by other means The specimen should come from the lung with as little admixture of saliva as possible It is desirable

broadcasting to discuss means by which radio may become a more effective instrument for education, both formal and informal, to serve as a clearing house for information on the latest technical and professional developments in educational broadcasting and to enable persons representing all phases of the subject to become acquainted and to exchange ideas and experiences

#### AN ADDRESS BY DR. GEORGE R. MINOT

On Thursday, November 19, 1936 at 8 30 p m, in the Auditorium of the Hospital for Joint Diseases Madison Avenue at 123rd Street, New York City Dr George R Minot will deliver an address entitled Anemia Etiology Diagnosis and Treatment This is the Walter M Brickner Lecture

#### RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR SEPTEMBER 1936

Disease	Sept 1936	Sept 1935	5 Yr Average*
Anterior Poliomyelitis.....	8	536	246
Chickenpox .....	75	99	85
Diphtheria .....	28	18	66
Dog Bite .....	562	793	577
Epidemic Cerebrospinal Meningitis	4	7	5
German Measles.....	32	46	28
Gonorrhea .....	571	553	593
Lobar Pneumonia.....	152	105	90
Measles .....	106	51	73
Mumps .....	180	217	124
Scarlet Fever.....	188	218	300
Syphilis .....	463	462	364
Tuberculosis, Pulmonary.....	203	257	280
Tuberculosis Other Forms .....	30	31	38
Typhoid Fever.....	19	12	22
Undulant Fever.....	5	3	1
Whooping Cough.....	569	254	422

Based on figures for preceding five years

#### RARE DISEASES

*Anterior poliomyelitis* was reported from Billerica 1 Boston 1 New Bedford 1 Northampton 1 North Andover 1 Reading, 1 Watertown 1 Weymouth 1 total 8

*Diphtheria* was reported from Beverly, 1 Boston 3 Chelmsford 1 Chelsea 1 Lowell 7 Lynn 1 New Bedford 8 North Adams 1 Worcester 5 total 28

*Dysentery, bacillary* was reported from Boston 1 *Encephalitis lethargica* was reported from Hudson 1 Swampscott, 1 total 2

*Epidemic cerebrospinal meningitis* was reported from Boston 1 Everett 1 Gardner, 1 Worcester 1 total 4

*Malaria* was reported from Brookline 1 Natick 1 Salem 1 total 3

*Pellagra* was reported from Lynn 1

*Septic sore throat* was reported from Abington 1 Boston 1 Lowell 1 total 3

*Tetanus* was reported from Hudson, 1 Nantucket 1 Springfield 2 total, 4

*Trachoma* was reported from Boston, 1 Malden 1 Marlboro, 1 Westfield 1 total 4

*Trichinosis* was reported from Attleboro 1, Boston 1 Brockton 1 total 3

*Typhoid fever* was reported from Amesbury, 1, Ashburnham, 1 Attleboro 3 Boston, 1 Brookline 1 Dartmouth 2 Essex 1 Hopkinton, 1 Lowell 1 Lynn 2 Melrose 1 New Bedford 1, Newburyport 1 Shirley, 1 Somerset 1 total 19

*Undulant fever* was reported from Attleboro, 1 Dalton 1 Norton 1 Pittsfield 2 total 5

Undulant fever is being reported fifty seven per cent above last year's record high figure

Both for September and this year to date lobar pneumonia continues higher than the five-year average

Anterior poliomyelitis had the lowest September incidence ever reported except for 1934 which it equaled The total cases to date are lower than any recorded year except 1919 at which time poliomyelitis was rarely diagnosed unless paralysis occurred

The reported incidence of epidemic cerebrospinal meningitis continues to be close to the five-year average after an unusually high incidence ending in July

The September incidence of diphtheria was lower than all previous years except 1935 Diphtheria incidence to date is slightly below last year's record low figure

Pulmonary tuberculosis had the lowest September incidence on record

The September incidence of scarlet fever was lower than all previous years except 1918

Measles mumps whooping cough and dog bites were reported above the five-year average

The reported incidence of chickenpox German measles tuberculosis (other forms) and typhoid fever was not remarkable

## CORRESPONDENCE

### TALE OF THE IGOROT AND THE AMOEBA

Mr Editor

The following quotation is from *An American Doctor's Odyssey*, by Victor Heiser M.D published by W W Norton Inc., New York, 1936

Dr Heiser was trying to instill a knowledge of sanitation among the Filipinos, particularly with regard to dysentery

Among the wild tribes who had the best opportunity to disseminate infection, there existed dense ignorance in regard to the nature of bacterial cleanliness To them a germ was a bug something that could be seen and dealt with by means of a bolo The difficulty of explaining to a primitive race the nature of microbes and their wicked doings was excellently illustrated by the endeavor of Winfred T

more serum than others. An additional 60 000 units of serum may be obtained from any of the above-mentioned laboratories if any of the following conditions are present

- (1) The patient has a bacteriemia as shown by finding Type I or II pneumococci in cultures of his blood
- (2) The patient is pregnant or has been delivered within seven days of the onset of pneumonia
- (3) If the temperature does not drop below 101° F by mouth within 18 hours of beginning treatment or, if having dropped, it again rises above this level within 48 hours

Further information concerning the administration of serum will be found in the circular accompanying the serum. The directions given in the circular should be followed in detail.

#### NURSING SERVICE FOR PNEUMONIA

Clinical experience has shown that patients receiving prompt medical and nursing care have the best chances of recovery. In almost every part of the State nursing service on a visit basis is available through the visiting nursing associations for patients not needing or who cannot afford a special nurse. In Boston the Community Health Association will give nursing care on a visit basis on the order of a physician. This Association will be glad to cooperate with physicians by sending a specimen of sputum for typing.

#### PNEUMONIA COMMITTEE,

##### BOSTON HEALTH LEAGUE

Dr Frederick T Lord Chairman  
Miss Dorothy Carter,  
Dr Henry D Chadwick  
Dr Frank Cruickshank,  
Dr Roderick Heffron,  
Dr Dwight O Hara,  
Dr Wilson G Smillie  
Miss Margaret H Tracy Secretary

#### FACULTY APPOINTMENTS IN HARVARD UNIVERSITY

Twentythree new faculty members in Harvard University have been appointed for the present academic year.

Four are at the Harvard Dental School. Leshe M Ohmart of Medford, Mass., as Instructor in Pharmacology. Carl T Leander of Jamaica Plain Mass., as Assistant in Prosthetic Dentistry. John A Tarule of Nashua, N H as Assistant in Prosthetic Dentistry and William L Wilson, of Everett Mass as Assistant in Orthodontia.

Seventeen are at the Harvard Medical School. Floyd C Turner of Newton, Mass. M.D. Chicago College of Medicine and Surgery 16, as Instructor in Preventive Medicine and Hygiene. Frederick W Barnes Jr. A.B. Yale 30 M.D. Johns Hopkins 34 Assistant in Pediatrics. Warren E Wheeler S.B. Mt. Union College 29 M.D. Harvard 33 Assistant

in Pediatrics, John M Wise, of Lexington, Mass., M.D. University of Buffalo '07, Assistant in Medicine. Benjamin Kropp, of Roxbury, Mass., S.B. Harvard 23 A.M. 24 Ph.D. 27, Research Fellow in Anatomy, Hsien i Chu M.D. Peiping Union Medical College 30 Research Fellow in Biological Chemistry. Jeanne F Manery, of Boston, Mass. A.B. University of Toronto '32, A.M. '33, Ph.D. '35, Research Fellow in Biological Chemistry. Jytte M Muus, M.S. University of Copenhagen '30, Research Fellow in Biological Chemistry. Mildred G Gray, of Somerville, Mass. S.B. Boston University '28 A.M. '33, Research Fellow in Neurology. Louis M Hellman, of Boston, Mass., Ph.B. Yale '30 M.D. Johns Hopkins 34, Research Fellow in Pathology. Daniel Bargeton of Paris M.D. University of Paris 36, Research Fellow in Physiology. Julien P F Maes M.D. University of Brussels, Belgium, 35, Research Fellow in Physiology. Florindo A Simeone, of Boston, Mass., A.B. Brown University '29, A.M. '30, M.D. Harvard '34 Research Fellow in Physiology, Harold C Wiggers of Boston Mass. A.B. Wesleyan 32, Ph.D. Western Reserve 36, Research Fellow in Physiology. Neil T McDermott of Cleveland, Ohio, A.B. Catholic University, Washington D.C. 28, M.D. Harvard '32 Research Fellow in Psychiatry, Benjamin V White Jr of Summit N.J., A.B. Princeton 30 M.D. Harvard 34 Research Fellow in Psychiatry and Rudolph V Naumann of Brookline, Mass., S.B. Northwestern 33 Teaching Fellow in Physiology.

Two are members of the Harvard Department of Hygiene. Ray L Whitney of Waverley, Mass., Ph.B. Brown University 00 M.D. Harvard 04, Assistant Medical Adviser and Jackson Flanders, of Melrose Mass., B.S. Harvard 24 M.D. 29 Assistant Surgical Adviser.

#### SAMUEL H EPSTEIN M.D., IS NOW WORKING IN LONDON

The first annual meeting of the British Branch of the International League Against Epilepsy was held in London, England on October 16 1936, and was attended by Dr Samuel H Epstein of Boston, a member of the American Branch of the League. Dr Epstein is on leave of absence from the Boston Psychopathic Hospital and is this year engaged in neurological work at the National Hospital, Queen Square, in London.

#### A NATIONAL CONFERENCE ON EDUCATIONAL BROADCASTING

Invitations have been sent to various persons to attend the First National Conference on Educational Broadcasting which will be held in Washington, D.C. at the Mayflower Hotel on December 10 11, and 12 1936. Eighteen organizations interested in every important phase of American education are sponsoring the conference in cooperation with the United States Office of Education and the Federal Communications Commission.

The purpose of the meeting is to enable the large number of persons who are interested in educational

which may be acquired by the innocent, the decent, the married woman and the married man no matter how moral their sex behavior may have been. Until then the cellars and subcellars will be good enough to house many a sorry venereal disease clinic. Half the medical fraternity will refuse to treat or acknowledge that they treat or learn how properly to treat those dirty diseases' and there will still be all too evident the almost brutal lack of sympathy for those who are infected.

The major obstacle to public education is the unfortunate point of view reflected by and perpetuated by our terminology shared alike by physicians, educators, editors, the clergy, the health worker and too, many others who should know better. Those of us who do know better will be in no position to change that point of view so long as we stand side by side with the uninformed in the mire of 'venereal disease'.

Some physicians and health officers seem to be of the opinion that terminology makes no difference. Can it be possible that they prefer 'pesthouse to communicable disease hospital, insane asylum to mental disease hospital and consumption to tuberculosis?' The majority however insist that although the term venereal disease is objectionable it is the only available collective term which may be applied to gonorrhea, syphilis, chancroid, granuloma inguinale, lymphogranuloma inguinale (now venerea') and a number of other epidemiologically related diseases.

Conceding that collective terminology has its usefulness we propose that the so-called 'venereal diseases' be known hereafter as the genitoinfectious diseases. The following arguments are advanced in support of this new terminology:

- 1 It implies nothing as to the conduct of the infected.
- 2 It does define the usual anatomic location of the dangerous lesion and classifies the disease as infectious.
- 3 It may be applied correctly and without unfair implication to any communicable disease acquired through sexual intercourse whether innocently or otherwise.
- 4 It may be applied to congenital syphilis since that form of the disease is acquired by the fetus in the mother's uterus which is one of the internal genitalia.
- 5 Gonococcal ophthalmia neonatorum may be called genitoinfectious disease because the infection occurs during the infant's migration through the mother's birth canal. Other gonococcal eye infections usually result from the transfer of infectious material from the genitals to the eye.
- 6 Gonococcal vulvovaginitis (and those vulvovaginal infections caused by the micrococcus catarrhalis and so forth) is a genitoinfectious disease.
- 7 The only exceptions are the very rare eye to eye infections with the gonococcus and those in

fections with syphilis or with other diseases in the group which are caused by extragenital contact with extragenital lesions or by transfusion. Even in these, the subsequent communicability depends in large measure upon the development of genital lesions. At any rate the occasional exception does not affect the usefulness of the term, so long as it is not slanderous.

- 8 The term genitoinfectious disease has an accepted half sister, 'genitourinary disease', which is in good standing and which is rapidly becoming popular.
- 9 For those who find abbreviations convenient, the V D clinic becomes the G I D clinic or a V D program becomes a G I D program.

It has been argued that too much time and effort will be required to popularize new terminology. Aside from the fact that it will require a great deal of confusing explanation to deodorize the term venereal disease which is only one among several of common origin and obnoxious connotation it has been a constant tendency of medicine to popularize scientific terminology. Thus inflammation of the bowels has become appendicitis, consumption has become tuberculosis, lockjaw has become tetanus, jail fever or ship fever has become typhus fever, and summer complaint has been lost altogether in the reclassification of the various diarrheas. Cystitis is preferred to inflammation of the bladder, and even piles are becoming hemorrhoids. One of these days patients will know what the doctor means who says gonorrhea instead of clap and syphilis is already better known than pox or the old rale is remembered. Most of these improvements in the terminology have been accomplished within the lifetimes of many of us. Who will be so bold as to insist that they have not been for the better?

The above is a liberal quotation from two editorials by Dr N. A. Nelson of this Department. For the past six years the Department has urged that the terms venereal disease and social disease be consigned to oblivion. The medical profession and the public health workers of Massachusetts have caught the spirit of the Department's purpose and it is safe to say that nowhere else in the United States are those terms used less frequently. In Massachusetts we say 'gonorrhea and syphilis'.

It is granted that a collective term is often convenient. This Department has accepted genitoinfectious disease as a collective term for gonorrhea, syphilis, chancroid and so forth and it has been pleased to learn that widely known syphilologists, urologists and health officials in this country and in Canada have also accepted it and are using it. Three state departments of health are moving to convert their divisions of venereal diseases into divisions of genitoinfectious diseases. This Department urges the general adoption of the term throughout this State.

Yours truly,

HENRY D CHADWICK M.D.,

Commissioner of Public Health

Dennison, Secretary of the Interior under Harrison, to teach the Igorots about the amoeba.

Mr Dennison was a little man and therefore not so much admired in the Mountain Province as his predecessor the gigantic Worcester. He was convinced that he could turn the Igorots' belief in evil spirits to good account, and asked that a motile amoeba be mounted for him on a microscopic slide. A lusty specimen was accordingly provided.

'We went on the annual tour of the Mountain Province and at one of the chief towns of the Igorots Mr Dennison decided to give his demonstration. He had one of the chiefs brought over and said to him: I want to show you an evil spirit that causes diseases. The white man can control him. If you look through this you will see him.'

'The Apo looked as directed and grunted. "What do you see?" No reply could be elicited. Mr Dennison then handed the Apo a pencil and paper and said: Draw what you see.' The Apo produced a very good likeness of an amoeba jumping about. Mr Dennison then triumphantly exclaimed, "That's what causes diseases that kill you, but we can kill it. You say that little thing can kill a man?" queried the Apo incredulously. "Yes," came Mr Dennison's confident reply. "Well, it might kill a little white man like you, but it wouldn't hurt a great big Apo like me."

Yours truly

WM PEARCE COUES M D

October 28 1936

#### GENITOINFECTION DISEASES

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

State House, Boston

October 26, 1936

Editor *New England Journal of Medicine*

That Word Venereal \* and The Genito-infectious Diseases†

New International Dictionary Webster

- 1 Venereal of or pertaining to venery or sexual love relating to sexual intercourse inclined to be lascivious
- 2 Venery Sexual intercourse coition also pursuit of sexual delight

New Standard Dictionary of the English Language  
Funk and Wagnalls

- 1 Venereal disease any disease communicated by sexual intercourse with an infected person
- 2 Venerean devoted to the service of Venus or to sexual intercourse wanton lascivious
- 3 Venerous lascivious
- 4 Venery sexual indulgence especially when excessive

It makes little difference that these terms find origin in Venus and that the arts of Venus are as applicable in marriage as out of it. It remains a fact that generations of popular usage have given

to them the narrower meanings which they now unquestionably bear. The whole people, not the lexicographer, have prescribed their definition. The popular understanding is deeply rooted that anything venereal or related to venery is lascivious or the result of sexual excess. Neither the term venery nor any of its derivatives can now be applied to normal moral sexual intercourse as consummated between husband and wife.

Those who would deodorize the term "venereal disease" (which is only one among several of common origin) by teaching that this one term does not always mean what it says, will discover that the public will not perform difficult and intricate feats in mental gymnastics. It was easier to discard the term 'consumption' and to teach the public to say 'tuberculosis' than it would have been to convince people that consumption as applied to tuberculosis does not have to mean what it says.

As a matter of fact generations of usage have served to make the term venereal disease so synonymous with lasciviousness and prostitution that a prudish desire to be less obvious has led to the coinage of a nicer (?) substitute 'social disease'. Thus the sordid connotation is made still more obvious by the deliberate effort to get farther away from it and is transferred to the otherwise respectable word 'social'.

Congenital infections account for perhaps ten per cent of all syphilis. Extragenital infections account for another five per cent. Is it to be implied that babies born with syphilis and the accidentally infected have acquired their infections through sexual intercourse at all, or through venery which by definition is lascivious sexual behavior? Married women infected with gonorrhea or syphilis by their husbands are more numerous than their promiscuously infected sisters. They have every legal and moral right to sexual intercourse with their husbands, and they deserve more understanding sympathy than may be expressed by stigmatizing them as venereally diseased. Gonococcal vulvovaginitis in young girls is usually innocent. Gonococcal ophthalmia neonatorum is neither a venereal disease nor is it acquired by the baby through sexual intercourse. Infections acquired at birth or accidentally or through normal decent moral sexual intercourse may be numbered not in the hundreds of thousands but in millions. These are not venereal diseases.

People can be taught that gonorrhea and syphilis are communicable diseases and as such are respecters of neither persons nor morals. They cannot be taught to understand that anyone who behaves can have a venereal disease because by usage and by definition anything venereal has its origin in sexual wantonness. People think of gonorrhea and syphilis as just rewards of those who will consort with prostitutes because gonorrhea and syphilis have always been called venereal diseases.

Unprejudiced public approval and generous public support of a program for the control of these diseases will not be forthcoming until the public learns that these are not venereal but communicable diseases.

\* Nelson N. A. That Word Venereal Editorial Am J Syphonor & Ven Dis 20:1 (Jan) 1936.  
† Nelson N. A. Genito-infectious Diseases Editorial Am J



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Conceding that collective terminology has its usefulness, we propose that the so-called venereal diseases be known hereafter as the genitoinfectious diseases. The following arguments are advanced in support of this new terminology:

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He was a Fellow of the Massachusetts Medical Society, a member of the National Tuberculosis Association, the Phi Sigma fraternity, the Trudeau Society of Boston and the Harvard Club.

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## REPORTS AND NOTICES OF MEETINGS

### OFFICERS OF THE AMERICAN CLINICAL AND CLIMATOLOGICAL ASSOCIATION

At the meeting of the American Clinical and Climatological Association held in Richmond, Virginia, October 27 1936, the following named officers were elected. President, Dr E James Paullin, Atlanta, Georgia, Vice President, Dr John B Hawes 2nd, Boston. Secretary-Treasurer Dr F M Rackemann, Boston. Recorder, Dr Francis B Trudeau, Saranac Lake, New York and Councilor, Dr L Whittington Gorham of Albany, New York.

### WILLIAM HARVEY SOCIETY

The first meeting of the William Harvey Society of the Tufts College Medical School for the current academic year, was held at the Beth Israel Hospital Tuesday evening October 20, 1936, Dr Louis E Phaneuf presiding. Dr J Fred Taussig, Professor of Clinical Obstetrics and Gynecology in the Washington University School of Medicine

spoke on 'The Control of Abortion' Dr Taussig stated that a careful analysis of statistics revealed that between 600 000 and 700 000 abortions occur each year in the United States, and that between 7,000 and 10,000 deaths annually are due to this cause. Control of this condition is necessary, but difficult because of the moral principles involved. Of the total number of abortions approximately 3 per cent are performed for therapeutic reasons, 30 per cent are spontaneous, and 66 per cent are illegally induced.

Preventive treatment is of the greatest importance in the control of spontaneous abortion, and should be directed to the elimination of germ plasm defects, correction of pelvic disorders and control of systemic disease. One third of the cases of spontaneous abortion are due to defects in the ovum or spermatozoon, defects which may be eliminated or minimized by abolishing vitamin deficiencies, endocrine imbalance, prostatic disorders, or poor general nutrition. Correction of such pelvic disorders as ovarian cysts, leiomyomata uteri, septate uteri, infantile uteri, relaxed perineal floors, lacerated cervixes and retroversion of the uterus in many instances serves to prevent the occurrence of abortion. The correction of systemic abnormalities such as inflammation in the appendix or gallbladder, lowered sugar tolerance, or foci of infection is desirable before pregnancy. Since spontaneous abortion occurs in 10 per cent of all pregnancies and usually within the first twelve weeks after conception a thorough examination of patients in the first trimester is very important. Routine basal metabolic rate determinations, and Wassermann tests are desirable. Detailed histories of previous pregnancies to determine any tendency to abort should be taken. Patients of low fertility as indicated by failure to conceive after one year of intercourse without contraception are more apt to abort than women of normal fertility. The tendency to abort is much more marked in women who have experienced one or more abortions as is indicated by the fact that abortions occur in approximately one of every five pregnancies in these patients as compared with the usual ratio of one in ten.

In cases showing a tendency to abort, care should be exercised to prevent too strenuous physical exercise, long automobile rides, constipation and too frequent intercourse particularly at those times when the menstrual period would have occurred if pregnancy had not intervened. Such measures as administration of corpus luteum extract or serum of normal pregnant women may be of some aid. The last two measures may serve to correct an endocrine imbalance which sensitizes the uterus and makes it hyperirritable. That such hyperirritability occurs is shown by the cases in which slight menstruation occurs after the onset of pregnancy.

A study of the underlying reasons why abortion was desired in a series of cases in Russia revealed poor economic status as the chief cause while illegit-

imacy accounted for a third of the total number. Induced abortion by trained persons in hospitals or clinics causes maternal mortality in only one-fifteenth as many cases as when abortion is performed by irresponsible persons. In spite of this fact the sequelae of wholesale abortion have been so severe that the Russian government has discontinued indiscriminate abortion and now performs abortion only in cases of physical disability, or in pregnancies occurring within nine months of a previous pregnancy. This government has undertaken the advocacy of contraception as a preferable means of birth control.

Legislative control of abortion is far from satisfactory. Juries usually give acquittals in spite of absolute evidence of criminal abortion. Statutes are in need of revision. An example of their inadequacy is afforded by the laws of Massachusetts which make a physician liable to seven years' imprisonment if he interrupts pregnancy for any reason whatsoever (even though it be to save the mother's life), and to twenty years imprisonment if the mother dies.

Dr Taussig suggested that the number of illegally induced abortions would be materially reduced if the economic status of the families of the nation were improved. Bonuses and tax exemptions may be of value in some cases, even though such measures have many undesirable features. He strongly advocated free maternal care during pregnancy and the puerperium in addition to that which is offered during the period of confinement.

The grave dangers of self-instrumentation should be firmly impressed upon the minds of all seeking abortion.

In the end, control of induced abortion will rest on the control of undesired pregnancies by contraceptive means. The contraceptive methods now at hand are not entirely satisfactory when they become so induced abortion will become an evil of the past.

#### DUNHAM LECTURES

Sir Frederick Gowland Hopkins, Professor of Biochemistry in the University of Cambridge, delivered the Dunham Lectures at the Harvard Medical School on October 6 and 8. The general subject of the lectures was 'The Significance of Catalysis in Biology,' and the first was devoted to a discussion of 'The Catalytic Equipment of Micro-Organisms.' Dr Hopkins pointed out that although biological catalysts have been known to exist for over one hundred years it is only within recent times that they have been shown to function within the cell and to be active in life processes. A study of the catalytic systems of micro-organisms has served to bridge the gap in our knowledge concerning oxidations in simple organic systems and those occurring in respiratory cells.

Using living but nonproliferating cultures of bacteria, Dr Hopkins and his associates studied the changes that occurred in the media. It was found

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By Samuel Elliot Morison Professor of History, Harvard University

Medical students and physicians are cordially invited to attend.

MARSHALL N FULTON, M.D., *Secretary*

### NEW ENGLAND HEART ASSOCIATION

The first meeting of the season of the New England Heart Association will be held in the auditorium of the Moseley Memorial Building of the Massachusetts General Hospital Monday, November 9 1936 at 8 15 p m.

#### PROGRAM

#### 1 Coronary Disease

The Speed of Healing of Myocardial Infarcts  
Drs Jorge Salcedo-Salgar, G Kenneth Mallory and Paul D White

A New Record in Longevity after Coronary Thrombosis

A Woman 22 Years Old with Myocardial Infarction. Dr Paul D White

Coronary Disease Under the Age of Forty Years  
Dr R E Glendy

#### 2. The Effect of Inhalation of Tobacco Smoke on the Electrocardiogram. Dr Ashton Graybiel

#### 3 The Heart Fifteen to Twenty Years after Severe Diphtheria Dr William Paul Thompson

#### 4. Electrocardiograms in Infancy with Especial Reference to Lead 4 Dr R E Glendy

#### 5 The Growing Importance of Cardiac Neurosis Dr Paul D White

All members of the New England Heart Association and interested physicians are invited to attend

JAMES M FAULKNER M.D., *Secretary*

### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY NOVEMBER 9, 1936

##### Monday November 9—

\*8 15 p m New England Heart Association Auditorium of the Moseley Memorial Building Massachusetts General Hospital

##### Tuesday November 10—

\*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Some of the Newer Aspects of Cancer Dr William Shedden

\*12 m - 1 p m Boston Society for the Advancement of Gastroenterology Outpatient Building Boston City Hospital.

8 00 p m Greater Boston Medical Society Beth Israel Hospital Auditorium Boston

\*8 15 p m Harvard Medical Society Peter Bent Brigham Hospital Amphitheater (Shattuck Street entrance)

\*8 30 p m The Arlington Doctors Club Nurses Home Symmes Arlington Hospital

##### Wednesday November 11—

112 m Clinico-Pathological Conference Children's Hospital Amphitheater

4 p m - 5 p m Surgical Pathological Conference Dr Cutler and Dr Wolbach Peter Bent Brigham Hospital.

##### Thursday, November 12—

\*8 30 a m - 9 30 a m Clinic Surgical and Orthopedic Staffs of the Children's Hospital at the Children's Hospital

\*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston. Acute Emyema Thoracis Dr J W Strieder

12 m Conference of Clinical Pathology Boston City Hospital Pathological Amphitheater

2 p m - 6 30 p m Trudeau Society New England Deaconess Hospital, Boston.

\*3 30 p m Medical Clinic Peter Bent Brigham Hospital Dr Henry A. Christian.

##### Friday November 13—

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\*Open to the medical profession

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November 5—Faulkner Hospital Clinical Meeting at the Faulkner Hospital 5 p m

November 6—William Harvey Society See page 55b issue of October 29

November 7—Health Developments in Massachusetts See page 503 issue of October 22

November 7—Massachusetts Conference of Social Work. See page 55b issue of October 29

November 9—New England Heart Association See page 899

November 10—Boston Society for the Advancement of Gastroenterology See page 55b issue of October 29

November 10—Harvard Medical Society See page 598

November 10—Greater Boston Medical Society See page 595

November 10—The Arlington Doctors Club See page 598

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November 12—Conference of Clinical Pathology the Boston City Hospital. See page 596

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November 16—One hundredth anniversary of the founding of the Army Medical Library 7th Street and Independence Avenue S W Washington D C

November 16—A Medical Historical Pageant. See page 596

November 17—South End Medical Club See page 598

November 17 20—Southern Medical Association. See page 503 issue of October 22

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March 30 April 2, 1937—First International Conference on Fever Therapy Postponement notice See page 52 issue of July 2

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### DISTRICT MEDICAL SOCIETIES

#### FRANKLIN DISTRICT MEDICAL SOCIETY

Will meet at the Weldon in Greenfield at 11 a m the second Tuesdays of November January March and May

CHARLES MOLINE M.D. *Secretary*

Sunderland

#### MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

November 18—Bear Hill Golf Club Stoneham

January 13 1937—Bear Hill Golf Club Stoneham

March 16 1937—Danvers State Hospital Danvers

May 11 1937—Bear Hill Golf Club Stoneham

KENNETH L. MACLACHLAN M.D. *Secretary*  
1 Bellevue Avenue Melrose

that the catalytic equipment of the bacteria was such as to allow the activation of intramolecular hydrogen and also of the hydrogen molecule itself. The catalytic action of the dehydrogenases caused the reduction of one molecule (with the removal of a hydrogen ion) and a simultaneous (primary or secondary) oxidation of a second molecule. A characteristic feature of catalysis in the cell was shown to be the great importance of intermediate processes. Such intermediary processes are of more importance in higher organisms than in bacteria.

Some of the bacterial catalysts are present at all times, while others are absent unless the substances upon which they normally act are present in the media to enable growth. Enzymes in nonproliferating cells reach a state of thermodynamic equilibrium proving the existence of true, uncomplicated catalysis.

Aerobic cultures were found to grow only if certain substances were present in combination. Processes of dehydrogenation furnish energy for such growth, the catalysts acting in some way upon the proteins and amino-acids present in the media.

The second lecture was on the subject "The Nature of Biocatalytic Systems in General." Certain enzymes are proteins, and have been prepared in crystalline form. Each enzyme is an individual protein molecule, and acts as an entire molecule, and not as any specific group of a molecule. Although there must be some fundamental difference between the protein molecule that is a catalyst, and one that is not a catalyst, the nature of this difference is at present unknown. It has been suggested that differences in the peptide chain may be responsible for this difference.

The fact that it is possible to train bacterial cultures to grow without substances which were essential for the growth of the original culture suggests that a new catalyst can be developed by such organisms. Variations in ability to develop new enzymes may play a very important rôle in adaptation of organisms to variations in environment.

Animal tissues contain many enzymes, and numerous co-enzymes. The former may be divided into two main classes, known as the dehydrogenases and the oxidases. There is no proof that either of these types is a protein molecule. The oxidases differ from the dehydrogenases by their greater affinity for their substrate.

In discussing the nature of co-enzymes, Dr. Hopkins pointed out that they are necessary to complete enzymatic systems. They probably function in successive stages of hydrogen transport. An illustration of such a co-enzymatic transporter was cited in the case of the substance 'glutathione', a tripeptide of known composition. Hydrogen is passed through this substance to oxygen, thus allowing the oxidation of various molecules present in the system.

Although it is difficult to conceive of each dehydrogenation in living tissue being due to a specific enzyme, Dr. Hopkins emphasized the importance of the concept of enzymatic specificity.

### THE ARLINGTON DOCTORS' CLUB

The regular meeting of the Arlington Doctors' Club will be held in the Nurses Home, Symmes Arlington Hospital, Tuesday evening November 10 at 8 30 p m.

The speaker will be Dr. Howard M. Clute, Surgeon in Chief of the Massachusetts Memorial Hospitals.

His subject will be "Common Surgical Abdominal Emergencies."

The paper will be discussed by Dr. George P. Towle and Dr. Stephen G. Jones, Surgeons to the Symmes Arlington Hospital.

All physicians are invited to attend.

FRANK H. GERRY, *President*,

SIDNEY M. SIMONS, *Secretary*

### SOUTH END MEDICAL CLUB

The next regular meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, November 17, 1936 at 12 noon.

The speaker will be Nathan Gorin, M.D., Associate Physician, Children's Hospital. His subject will be "Infant Feeding." All physicians are cordially welcome to attend.

### WORCESTER DISTRICT MEDICAL SOCIETY CHANGE OF DATE

The date of the November meeting of the Worcester District Medical Society has been changed from Wednesday, November 11, to Wednesday, November 18, 1936. This meeting will be held at the Grafton State Hospital. The subject for the paper will be announced at a later date.

ERWIN C. MILLER, M.D., *Secretary*

### GREATER BOSTON MEDICAL SOCIETY

There will be a meeting of the Greater Boston Medical Society on Tuesday, November 10, at the Beth Israel Hospital Auditorium, Boston at 8 p m.

#### PROGRAM

Effects of Protamine-Zinc Insulin and Other Mixtures of Zinc and Insulin in Diabetes Mellitus. By I. M. Rabinowitch, M.D., D.Sc., F.R.C.P. (Can.), of Montreal, Assistant Professor of Medicine and Lecturer in Pathological Chemistry, McGill University Medical School.

H. A. KONTOFF, M.D., *President*

D. B. STEARNS, M.D., *Secretary*

### HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheater (Shattuck Street Entrance), Tuesday evening November 10, at 8 15 p m.

#### PROGRAM

Presentation of Cases

A Few High Lights in Harvard Medical History

By Samuel Eliot Morison, Professor of History, Harvard University

Medical students and physicians are cordially invited to attend

MARSHALL N. FULTON, M.D., *Secretary*

## NEW ENGLAND HEART ASSOCIATION

The first meeting of the season of the New England Heart Association will be held in the auditorium of the Moseley Memorial Building of the Massachusetts General Hospital, Monday, November 9 1936 at 8 15 p m

### PROGRAM

#### 1 Coronary Disease

The Speed of Healing of Myocardial Infarcts  
Drs Jorge Salcedo-Salgar, G Kenneth Mallory and Paul D White

A New Record in Longevity after Coronary Thrombosis

A Woman 22 Years Old with Myocardial Infarction Dr Paul D White

Coronary Disease Under the Age of Forty Years  
Dr R E Glendy

#### 2 The Effect of Inhalation of Tobacco Smoke on the Electrocardiogram Dr Ashton Graybiel

#### 3 The Heart Fifteen to Twenty Years after Severe Diphtheria Dr William Paul Thompson

#### 4. Electrocardiograms in Infancy, with Especial Reference to Lead 4. Dr R E Glendy

#### 5 The Growing Importance of Cardiac Neurosis Dr Paul D White

All members of the New England Heart Association and interested physicians are invited to attend

JAMES M FAULKNER M.D. *Secretary*

## SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, NOVEMBER 9, 1936

#### Monday November 9—

\*8 15 p m New England Heart Association Auditorium of the Moseley Memorial Building Massachusetts General Hospital.

#### Tuesday November 10—

\*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Some of the Newer Aspects of Cancer Dr William Shedden.

\*12 m - 1 p m Boston Society for the Advancement of Gastroenterology Outpatient Building Boston City Hospital

8 00 p m Greater Boston Medical Society Beth Israel Hospital Auditorium Boston

\*8 15 p m Harvard Medical Society Peter Bent Brigham Hospital Amphitheater (Shattuck Street entrance)

8 00 p m The Arlington Doctors Club Nurses Home Synnemes Arlington Hospital

#### Wednesday November 11—

11 a m Clinico Pathological Conference Children's Hospital Amphitheater

4 p m - 5 p m Surgical Pathological Conference Dr Cutler and Dr Wolbach Peter Bent Brigham Hospital

#### Thursday, November 12—

\*8 30 a m - 9 30 a m Clinic Surgical and Orthopedic Staffs of the Children's Hospital at the Children's Hospital.

\*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Acute Empyema Thoracis Dr J W Strieder

12 m Conference of Clinical Pathology Boston City Hospital Pathological Amphitheater

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# The New England Journal of Medicine

VOLUME 215

NOVEMBER 12, 1936

NUMBER 20

## HUMAN BITE INFECTIONS OF THE HAND\*

BY CLAUDE E. WELCH, M.D.†

**H**UMAN bites of the hand are relatively uncommon, but frequently cause fulminant and dangerous infections. The rarity of such a type of sepsis may account for the scant consideration it has received in medical literature. For this reason, and because early diagnosis and proper treatment are so important, it seems worth while to report the cases observed in the Massachusetts General Hospital during the last eleven years.

*Historical summary.* The course of human bite infections of the hand determined from a study of 13 cases and from experimental injections has been described very clearly by Mason and Koch.<sup>11</sup> These authors emphasized the persistent nature of the infections, and advocated immediate careful cleaning of the wound followed by the application of large, wet packs. The only other comprehensive contribution in the literature was made by Bates,<sup>1</sup> who reported 130 cases from Philadelphia. All of the bites were successfully treated by electrocautery excision soon after injury. Flick<sup>4</sup> reported six cases, all of which had Vincent's organisms in the infected wounds. A few other recent cases have been described by several other authors including Hudacek,<sup>9</sup> Frankenthal,<sup>6</sup> Dimitza,<sup>3</sup> Colby, and Bower.<sup>2</sup> There are still, however, very few papers on this subject in the literature and the method of treatment is far from standardized.

*Incidence.* The frequency of human bites of the hand cannot be estimated, but it is certainly much greater than that indicated by the sparsity of case reports. Undoubtedly many small lacerations and inconsequential infections are caused by bites and rarely reach a hospital. On the other hand, all serious infections require hospital care. In a search of the house records of the Massachusetts General Hospital during this eleven-year period, 18 cases of human bite infection of the hand were discovered. They comprised about 1 per cent of the cases of infections of the hand admitted to the hospital wards for treatment.

*Clinical course.* The clinical course is re-

markably constant in most of these cases. Typically a young man strikes another in the mouth with his closed fist. The impact of the tooth produces a laceration over the knuckles of the index or middle fingers. The laceration is tiny, but deep, frequently penetrating the extensor tendon, and usually entering the joint. The patient notes little discomfort for 6 to 12 hours. Then the dorsum of the finger and hand swells, and a dusky red color appears. Soon a thin, gray, malodorous discharge begins to run from the wound. Pain on movement of the finger indicates the progression of a septic arthritis. At this time mercurochrome or iodine is usually applied to the wound and soaks are instituted without relief. The patient develops moderate fever and malaise, and finally appears in the hospital 3 to 4 days after his injury.

At this time the whole dorsum of the hand is found to be swollen and red. Pus, similar in color to that of a lung abscess, exudes from the laceration on pressure either about the knuckle or on the anterior surface of the metacarpophalangeal joint. Motion of this joint is restricted and painful. No extension of sepsis is found distally along the finger, nor is there any indication of infection on the volar surface. Lymphangitis is not usual, but may be present. There is a temperature of 100-102 degrees, and the patient complains of chilliness and headache. The white cell count is variable but may be as high as 25,000. An x-ray of the finger at this time is negative.

Smears and cultures of the pus are taken. Operation is then performed on the same day, provided it is not contraindicated by extensive lymphangitis. Afterward the hand is elevated on a pillow and splinted. Hot packs are applied. The temperature soon drops to normal. In favorable cases the purulent discharge gradually diminishes and finally the incision closes by secondary intention in 2 to 3 weeks. Very commonly, however, about a week after the initial drainage, the amount of pus increases, and the temperature begins to rise slightly. An x-ray shows arthritis with osteomyelitis of the proximal phalanx and of the head of the metacarpal. Further drainage of the joint may result in improvement, but usually amputation of the finger and head of the metacarpal will be required.

\*From the Surgical Service of the Massachusetts General Hospital.

†WELCH, CLAUDE E.—Resident, East Surgical Service, Massachusetts General Hospital. For record and address of author see "This Week's Issue," page 944.

## NORFOLK DISTRICT MEDICAL SOCIETY

November 24—8 15 p m The Beth Israel Hospital. Communications and Case Presentations by the Staff. Principal subject—Cardiology. Details of program to be announced.

January 19, 1937—8 15 p m The Peter Bent Brigham Hospital. Communications and Case Presentations by the Staff. Suggested title—Abdominal Pain from the Medical and Surgical Standpoint. Details of program to be announced.

February 23, 1937—Time place and details of program to be announced.

March 30, 1937—8 15 p m New England Deaconess Hospital. A Symposium on Diabetes entitled A Survey of the Diabetic Work of the George F Baker Clinic in the New England Deaconess Hospital. Communications and Case Presentations by the Staff. Drs Elliott P Joslin Howard F Root Priscilla White, Alexander Marble and Allen P Joslin.

May, 1937—Annual Meeting. Details to be announced.

Note The Censors will meet for the examination of candidates on the first Thursday of May 1937. Fee of \$10.00 is payable at the time of examination. Application blanks may be obtained by writing the Secretary furnishing name, address and name of school of graduation in medicine. Application must be made at least three weeks prior to date of examination. Candidates whose applications are on file will receive proper notices.

FRANK S CRUICKSHANK, M.D. Secretary

1247 Beacon Street Brookline

## PLYMOUTH DISTRICT MEDICAL SOCIETY

November 19—6 p m Goddard Hospital.

January 21, 1937—11 a m Bridgewater State Farm.

March 18, 1937—11 a m Brockton Hospital.

April 15, 1937—Annual Meeting 11 a m Ducey Hospital.

May 20, 1937—11 a m. Lakeville State Sanatorium.

FRED F WEINER, M.D. Secretary

231 Main Street Brockton

## SUFFOLK DISTRICT MEDICAL SOCIETY

November 18, 1936—Boston Medical Library 8 15 p m. Hydrocarbons and Cancer. Dr M J Shear—U S P H. Service. Cancer Research. Recent Advances in Our Knowledge of Cancer. Dr J C Aub. Discussion. Dr J W Schereschewsky U S P H. Service and Dr R B Greenough.

January 27, 1937—Boston Medical Library 8 15 p m. Joint Meeting with the Boston Medical Library. Anthropology. Dr Carleton S Coon.

March 31, 1937—Boston Medical Library 8 15 p m. Social Insurance—It Affects the Medical Profession. Dr Charles E Mongan. Discussion. Dr Channing Frothingham.

April 28, 1937—Annual Meeting. Boston Medical Library 8 15 p m. Problems in Surgical Diagnosis. Dr Howard M. Clute.

CONRAD WESSELHOEFT M.D. President  
CHARLES C LUND M.D. Secretary

## WORCESTER DISTRICT MEDICAL SOCIETY

November 18. Note change of date. See page 898.

December 9—St. Vincent Hospital Worcester Mass 6 15 p m. Dinner—complimentary by the hospital. 7 30 p m. Business session and scientific program.

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April 14, 1937—Worcester Hahnemann Hospital Worcester Mass 6 15 p m. Dinner—complimentary by the hospital. 7 30 p m. Business session and scientific program.

May 6, 1937—At 4 30 in the rooms of the Worcester Medical Library Inc. at 34 Elm Street Worcester will be held the spring meeting of the Board of Censors.

Wednesday Afternoon and Evening May 12, 1937—Annual Meeting. Time and place for this meeting will be announced in an early spring issue of the Journal.

ERWIN C MILLER M.D., Secretary

27 Elm Street Worcester

## BOOK REVIEWS

Minor Surgery Frederick Christopher Third Edition. Reset 1030 pp. Philadelphia and London W B Saunders Company \$10.00.

Christopher has brought this book thoroughly up to date in this, the third edition. He has added material on wound healing, bacteriophage resuscitation upon the operating table, Elliott treatment of pelvic inflammatory disease, aspiration biopsy, Wainwright stomach suction apparatus, lymphogranuloma inguinale, ileopectineal bursitis and many other subjects. A new section on the injection treatment of hernias appears.

The author carefully restricts himself to minor surgical subjects, conditions handled in an office or a clinic. Tumors, with the exception of those in the skin, call for but brief comment. Chest and abdominal surgery are considered major subjects. However, there are vast numbers of surgical conditions which are treated by nonoperative methods and these fill a large book.

Among the subjects rather fully discussed are burns, fractures, circulatory diseases, infections, diseases of the rectum and anus, diseases of the genitourinary organs, minor surgical technic and a whole chapter on the "surgical interne".

The book is well constructed, well illustrated and is an important addition to a surgeon's library.

Delafield and Prudden's Text Book of Pathology Revised by Francis Carter Wood 1406 pp. Sixteenth Edition. Baltimore. William Wood & Company \$10.00.

The sixteenth edition of Delafield and Prudden's Text Book of Pathology appears fifty one years after the first edition. I know of no other textbook of pathology that has stood the test of time so well, largely owing to the indefatigable industry, power of objective description, and analytical ability of the authors. The recent editions, edited by Francis Carter Wood, have maintained the excellence of the earlier volumes.

Not an easy book for students to follow the mass of information, the objectivity of the descriptions make it a most useful book for the practitioner interested in pathology and the practicing pathologist.

The illustrations are numerous and well chosen. Some of the newer aspects of pathology particularly on the physiologic side, are neglected, but intentionally so.

Its 1406 pages make it ponderous, but it is difficult to see how it could be condensed further without sacrifice. The section on the nervous system has been more heavily revised than other sections as compared with the last edition.

The value of the work as a whole could be considerably enhanced if more references to the recent literature were included. Few pathologic laboratories can afford to be without this book.

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markably constant in most of these cases. Typically a young man strikes another in the mouth with his closed fist. The impact of the tooth produces a laceration over the knuckles of the index or middle fingers. The laceration is tiny but deep, frequently penetrating the extensor tendon, and usually entering the joint. The patient notes little discomfort for 6 to 12 hours. Then the dorsum of the finger and hand swells, and a dusky red color appears. Soon a thin gray, malodorous discharge begins to run from the wound. Pain on movement of the finger indicates the progression of a septic arthritis. At this time mercurochrome or iodine is usually applied to the wound and soaks are instituted without relief. The patient develops moderate fever and malaise, and finally appears in the hospital 3 to 4 days after his injury.

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The essential features of the human bite infections are, then, the location of the laceration, the character of the pus, and the tendency to involve joint and bone. The various details will now be considered.

**Site of injury** All cases, except two, received the typical type of injury. These two received bites near the tips of their fingers. The bites were equally distributed on both hands. In one case the injury was on the fifth knuckle, and in one on the fourth, but in all the others the index or middle knuckles were involved.

**Early treatment** In this series of cases the failure of treatment must be judged by the necessity of amputation of a finger, since no sepsis extended beyond the wrist. By this criterion, early adequate treatment is extremely important. Nearly all cases had some antiseptic applied soon after injury. One laceration was sutured shortly afterward, amputation was required later. Three other cases were seen by physicians and given treatment that later proved to be inadequate, two of these fingers finally had to be amputated.

Unfortunately we received only three cases within 12 hours after injury. Two of them had rapid and satisfactory healing after diathermy excision, and the third after cauterization with nitric acid. After the first 24 hours the virulence of the infection assumes the most important rôle and no constant relation between the delay and result is apparent. Amputations were necessary in two cases that delayed only 24 hours.

**Bacteriology** The type of infecting organism is the most important prognostic consideration. Smears should always be made since spirochetes and fusiform bacilli grow poorly in culture. Both aerobic and anaerobic cultures are indicated. A multiplicity of organisms is the rule. Most common is *Streptococcus viridans*. *Staphylococcus aureus* is also common. Hemolytic streptococci are occasionally found in pure culture. Diphtheroids are frequent, but of no significance.

The prognosis is worst if spirochetes and fusiform bacilli are frequent in the smear. Fortunately they usually are not abundant and often are absent. Three of our cases showed spirochetes, and two of this group required amputation. Since smears were not made in all cases it is likely that several infections in which only a few Vincent's organisms were present were not included. Three of our cases from which *Staphylococcus aureus* was recovered came to amputation, while in the other three cases with this organism it was not necessary. The non-hemolytic streptococcus is definitely more benign in this location, since out of the six cases in which it was found, and *Staphylococcus aureus*

was absent, there was only one amputation. Two cases had hemolytic streptococci, amputation was necessary in one.

**Treatment** The type of treatment to be employed depends upon the location and depth of the laceration and degree of infection. If it is absolutely certain that the wound does not extend through the skin, immediate, thorough cauterization with nitric acid is the treatment of choice (Case 1). If the depth of the laceration cannot be determined definitely, if it overlies a knuckle, extends through the skin, or is not seen immediately after injury, either excision with the electrocautery or surgical drainage is indicated.

The electrocautery should be reserved for comparatively early cases without much surrounding cellulitis. Approximately 0.5 to 1.0 cm. of tissue surrounding the laceration must be excised. If the wound extends through the extensor tendon, the ragged edges must be cauterized. Evidence of penetration through the joint capsule demands a wide incision. The cautery was used in four cases, one finger had to be amputated later.

Other cases, grossly infected and neglected, usually appearing in the hospital 2 days or more after injury, must be treated by radical incision and drainage.

The surgical pathology is remarkably uniform in these cases. The laceration is usually found on the radial side of the extensor tendon, or perhaps has severed a few of its fibers. A small opening into the joint capsule must be looked for carefully. If none is present the infection is simply one of the subcutaneous and subtendinous spaces of the dorsum of the hand, and is usually rapidly relieved. If the capsule of the joint has been opened, the problem is essentially that of a septic arthritis. The finger will be saved only in case adequate drainage is established. The capsule should therefore be opened widely. The extensor tendon is retracted medially while this is done. Later it is almost certain to fall back into position and prohibit adequate drainage. For this reason we believe it is wise in the more severe cases to incise both adjacent web spaces, cut the lateral ligaments of the metacarpophalangeal joint, and open the capsule widely laterally. The drainage is done with a tourniquet on the arm. Operation must be radical rather than conservative. The incisions should either be left wide open or packed very loosely with boric gauze. A thick boric plug should not be employed since it promotes anaerobiasis.

A few cases appear in the hospital many days after the original injury with lymphangitis or lymphadenitis, large hot wet packs are used if the local lesion has practically healed.

**Complications** Complications are frequent

and all are due to insufficient drainage of the joint cavity. There is rapid involvement of the heads of the metacarpal and proximal phalanx. The distended synovial membrane ruptures laterally into the web spaces. Less common but far more serious, is anterior rupture into the tendon sheath of the flexor tendons. This occurred in only one of our cases (case 9). In occasional instances infection may be carried by way of the lumbrical canals into the thenar or midpalmar spaces. This complication was also found in only one case in our series, an infection of the thenar space (case 11).

Inadequately drained cases apparently progress satisfactorily for about a week. Then the temperature begins to rise in the afternoon to 99 or 100 degrees. The white blood count is usually not elevated at this time, and it is not to be relied upon as an indication of the status of the infection. Coincidentally with the temperature rise there is an increased amount of drainage. At this time the incision has nearly closed with granulation tissue. Pressure on the anterior surface of the joint produces a free flow of pus posteriorly. The characteristic bone involvement becomes apparent by x-ray about the tenth day. Extension into the web spaces is indicated by local swelling and by the discharge of pus posteriorly on pressure in these locations. Incisions of the web spaces should be made and the capsule of the joint opened laterally if marked improvement is not apparent a week after the initial operation.

Involvement of the flexor tendon sheath usually arises from anterior perforation of the joint capsule, but may follow anterior discharge from an osteomyelitic focus. Because of previous edema and immobility of the finger its pressure is difficult to determine. The most constant signs are diffuse swelling of the finger and tenderness on pressure over the tendon sheath. Exploration of the sheath should be delayed until diagnosis is certain but once certain, the finger should be amputated. This radical treatment is indicated because of the nature of the infection. There is so much destruction of tissue that, even if healing were obtained, the finger would be stiff and useless. Furthermore, the danger of proximal extension from an infected sheath is so great that amputation of the finger should be done to prevent infection of the palmar spaces.

If amputation is necessary the site of election is just proximal to the head of the metacarpal, for retained cartilage is always infected and rarely heals spontaneously. The head must also be removed because it is nearly always involved in osteomyelitis. Occasionally the entire metacarpal will sequestrate (case 9). Definite evidence of osteomyelitis, either by x-ray or in the amputated specimen, was present in seven of our

cases. Infections of the thenar and midpalmar spaces are incised according to Kanavel's method. None of the patients in this clinic have had sepsis extend beyond the wrist.

In the Massachusetts General series, 15 of the 18 cases had surgery performed. One was cauterized with nitric acid. Two subsided with poultices. One had an incision of an axillary abscess. Of the 14 cases remaining, 9 were successfully controlled by one operation, of these one was a primary amputation. The other 5 cases required amputation of a finger at a secondary operation. One patient had 6 operations, ending with the removal of an entire metacarpal.

*Adjuvant treatment.* Postoperatively the hand should be splinted and elevated on a pillow with the dorsum directed downward. Drainage of the joint space by gravity is promoted in this manner. While protracted soaking is to be avoided, in most cases short soaks every 2 hours can be continued for 2 days with great benefit. After that time frequent irrigations should be substituted. The most potent solutions to be employed should theoretically contain oxidizing substances. Potassium permanganate (1/1000 solution), hydrogen peroxide, or saturated sodium perborate solution is satisfactory. Zinc peroxide is of no value because it tends to obstruct drainage from the joint. Dakin's irrigations are usually tolerated poorly in the more acute stages of the infection.

Intravenous arsphenamine has been given to 5 cases. It was usually given on the day following the initial operation. Three had only one dose, one had 2, one 3. Of this group, 4 cases required amputation. It seems highly improbable, therefore, that arsphenamine is of any value. We have not employed arsenicals to irrigate the wounds, this has been done by Flick,<sup>1</sup> whose case did not seem to be influenced by their application.

The possibility of a syphilitic infection from the bite should be considered and blood for a Wassermann taken before the patient is discharged from the hospital. This complication has not been noted in our cases, although instances have been reported by Lyons, and Mazum.<sup>12</sup>

*Hospital stay.* The average length of stay in the hospital was 15 days. The shortest was 3 days, the longest 8 weeks.

*Discussion.* The correlation of several small series of case reports is difficult, but can be made most simply if they are classified according to the length of delay before hospital care is instituted. By this criterion it is possible arbitrarily to divide them into early cases treated immediately after injury, delayed seen from 12 hours to a week afterward, and late

TABLE 1  
EARLY CASES

Author	Time to Entry	Bacteriology	Result
Flick (1)	At once	Vincent s	Osteomyelitis patient left
(2)			Disarticulation, distal phalanx
(4)		"	Healed
Bower			"
Dimtza		Strep Staph	Amputation upper arm
Mason (3)		B vulgaris	Flail finger
(10)		—	Stiff finger
Welch (1)		—	Healed
(2)		—	
(3)		Strep viridans	

NOTE The numbers refer to individual patients

TABLE 2  
DELAYED CASES

Author	Time to Entry	Bacteriology	Result
Flick (3)	2 days	Vincent s	Amputation hand
(5)	1		Disarticulation, distal phalanx amputation advised.
(6)	5 "		Died, extensive sepsis
Frankenthal	4 "	Staph Strep	Amputation, finger
Dimtza	3 "	—	Stiff finger
(5)		Strep	Died, extensive sepsis
Mason (7)	3 "	Vincent s Staph	Healed
(8)	7 "	Strep hem Staph	Stiff metacarpophalangeal joint
(9)	4 "	—	Amputation upper arm
(12)	3 "	—	Flail finger
(13)	3 "	Strep hem	Chronic septic arthritis
		gram — bacillus	
Welch (4)	1 "	Strep viridans	Amputation finger
		gram + bacillus	
(5)	1 "	Nonhem strep	Amputation finger
(6)	2 "	Strep viridans	Healed
		gram — bacillus	
(7)	3 "	Strep hem	
(8)	3 "	Vincent s Staph	"
(9)	4 "		Amputation, finger and metacarpal
		Strep hem	
(10)	7	Staph albus	Healed
		Nonhem strep	
(11)	7	Staph aureus	Amputation finger
		B proteus	
(12)	2 "	Staph aureus	Healed
(13)	6 "	Nonhem strep	
Peters	2	Vincent s	
Hultgen	7		
Fuller	5 "		Amputation finger

TABLE 3  
LATE CASES

Author	Time to Entry	Bacteriology	Result
Mason (1)	3 weeks	—	Healed.
(2)	5 months	—	
(4)	10 days	—	
(5)	11	Vincent s	
(6)	1 month		Good function recurrent sepsis.
(11)	3 weeks	cocci	Healed
		bacilli	
Welch (14)	8 days	Staph aureus	Patient left with osteo
(15)	10	Nonhem strep	Healed.
(16)	13	Vincent s	Amputation finger
(17)	3 weeks	—	Amputation finger
(18)	6	—	Healed.
Pilot	3	Vincent s	Amputation, distal phalanx.
Hennessy	2		Amputation thumb

cases that appear after a longer interval than one week. The data thus obtained are summarized in tables 1, 2, and 3.

There were ten cases treated immediately after injury. The bad results in this group are due in general to treatment now considered to be incorrect. Dimitzas' patient had immediate excision of the laceration followed by iodine, suture and anaerobic serum sepsis developed requiring disarticulation of the finger and later, upper arm amputation. One of Mason and Koch's<sup>11</sup> patients also had immediate suture when he stated falsely that he had cut his hand on a piece of tin, he left the hospital with a flail finger. Another had hot packs for 2 days before incision was done and developed a stiff finger. The only other amputation in this group could not have been avoided.

It is in the group of delayed cases that the disease is so severe. Of the 24 cases there were 2 deaths and, in addition, 7 amputations. Only 7 cases healed without deformity.

In the group of late cases are included the less virulent infections since the patients are hospitalized for the persistence rather than the severity of the infection. There were 13 patients, of whom 4 had finger amputations. No deaths occurred.

Unfortunately it is impossible to include Bates'<sup>12</sup> series in this list, because the details are not given in his paper. However, of 130 cases which he has treated by cautery excision some as late as the third or fourth day, he has had to amputate fingers only twice. In none of his cases studied by smear or culture were Vincent's organisms found. The importance of the use of the cautery is emphasized by the comparison of his brilliant results with those of other surgeons who have not employed it. We are inclined, however, not to use the cautery in every case, as he advises, for many patients appear with such extensive sepsis that any attempt to excise all the infected tissue would require too great a destruction of tissue.

In general terms it may be concluded from this survey that if human bites are treated promptly and correctly not more than one amputation out of ten cases should be necessary. If the patient delays 12 hours or more before adequate treatment is instituted amputation or, rarely, death, is to be expected in a third of the cases and a perfect functional result can be expected in only a third of the group. A delay of over a week is associated with a lower virulence and in this series, with amputation in a third of the group, but with no deaths.

#### CONCLUSIONS

- (1) A series of 18 cases of human bite infections of the hand from the Massachusetts General Hospital is presented.

- (2) The important clinical features of such an injury are the peculiar type of laceration and the foul infection with early involvement of joints and bones.
- (3) Many types of bacteria are usually present, the most dangerous are the anaerobic Vincent's organisms.
- (4) The important factors in determination of prognosis are (1) the presence of infection within the joint, (2) the type of infecting organism, and (3) the length of time before surgery is employed.
- (5) In this series secondary operations were necessary in 5 out of 15 operative cases. There were 6 amputations of fingers.
- (6) Neosarsphenamine appears to be of no value in treatment.
- (7) Diathermy excision of the laceration is advocated in early cases. Primary suture is exceedingly dangerous.
- (8) From a review of all reported cases it appears that about one case out of ten will require amputation of a finger if treated within 12 hours, if surgery is delayed from 1 to 7 days amputation will be necessary in one out of three cases, while an additional third will retain a stiff or flail finger.

#### CASE REPORTS

##### I. EARLY CASES

- (1) E. W. No. 3042. F. R. This bartender entered the Emergency Ward immediately after he stuck a finger in a drunken man's mouth and was bitten. The bite removed a small area of skin near the tip of his left middle finger. A second small laceration did not extend through the skin. The wounds were cauterized with nitric acid. Healing was rapid without infection.
- (2) E. S. No. 325831. M. K. Fifteen minutes before entry this 15 year old boy struck a friend in the mouth with his fist. He received a cut over the right middle knuckle. Electrocautery excision of the laceration was done. A rather large tooth laceration extended through the extensor tendon. This was also completely excised leaving a rim of tendon. The bacteriologic report was *Streptococcus viridans* and diphtheroids. Postoperatively boric soaks were employed for 2 days followed by boric packs. 0.15 gm. of neosarsphenamine were given intravenously on the second day. The wound cleaned rapidly and on the seventh day secondary suture was done. The patient was discharged 3 days thereafter. Movement of the tendon was normal when he was observed later in the Outpatient Department.
- (3) W. S. No. 329968. J. B. A 22 year old man entered the hospital with a laceration over the second and third knuckles of his left hand. Shortly before entry he had struck a man in the mouth while fighting. Cautery excision was done at once removing about a quarter of an inch of skin and subcutaneous tissue from the margins of the wound. There seemed to be a puncture into the capsule of the joint but it was not opened. The patient was

discharged in 3 days with a clean granulating wound. One month later the patient was last seen in the Outpatient Department at that time the incision had nearly closed.

## II DELAYED CASES

(4) E S No 324120 A L Twenty hours before entry this 13 year old boy cut his right fourth knuckle on his brother's teeth during a fight. Five hours later the hand became painful and was soaked without relief. On entry he showed a 1 cm wound which discharged thin pus. With the scalpel the laceration was explored. It did not extend into the joint but could be followed into the third web space. This was opened widely. *Streptococcus viridans* and a gram positive bacillus grew on culture. Boric packs were given postoperatively. Eight days later the white count had dropped from 26,000 to 10,000 but the temperature continued to rise to 100 degrees. The finger was amputated at that time just proximal to the head of the metacarpal. The specimen showed a chronic osteomyelitis and roughening of the surfaces of the metacarpophalangeal joint. Healing was rapid and the patient was discharged 10 days later to the Outpatient Department. The hand had healed one month later.

This patient in view of our later experience, would not have lost his finger if the primary incision had been with the cautery, and if the joint capsule had been opened at once.

(5) E S No 331262 G T This 21 year old man, fighting on the night before entry, cut his right middle knuckle on the tooth of his adversary. He at once soaked his hand in creolin, and applied iodine. Shortly afterward he went to a relief station where a salve was applied. He arrived here with a 1.5 cm laceration across the knuckle with a slight degree of surrounding cellulitis. With the diathermy an incision was made. The joint space was found to be infected and was opened. *Micrococcus catarrhalis* and nonhemolytic streptococcus grew on culture. The purulent discharge failed to subside. 0.45 gm of neocarsphenamine were given a week after the primary operation. Two hourly sodium perborate soaks were employed. Eleven days after the first operation a second exploration revealed complete separation of the extensor tendon and a purulent arthritis. The finger was disarticulated. *Staphylococcus aureus* was obtained on culture at that time. Improvement was rapid. The patient was discharged in 11 days. He was seen a month later in the Outpatient Department at this time the wound had practically healed.

Failure in this case was due partially to the patient's delay, partially to the fact that the infected tract was incised, rather than excised.

(6) E S No 326806 C H This 22 year old girl hit her companion in the mouth with her right index knuckle 2 days before entry. She was seen in another hospital the day after she received the laceration soaks were advised. On entry here she presented the usual laceration and cellulitis. The wound was opened widely and the edges of a ragged cut perforating the tendon were excised. No gross infection of the joint could be demonstrated so the capsule was not opened. Boric acid and sodium perborate soaks were given alternately every hour for 2 days. On culture *Streptococcus viridans* and a gram positive bacillus were obtained. Granulations appeared rapidly. Secondary suture was done on the ninth day and the patient discharged 4 days later.

(7) E S No 346564 G W This 17 year old boy struck a companion on the teeth 3 days before

entry. Twenty four hours later the finger became swollen and painful. Boric soaks gave no relief. He showed, on arrival a dirty laceration over the third knuckle of the right hand with surrounding cellulitis. Thin foul pus was draining from the incision. A wide cautery excision was done. The extensor tendon had not been injured but the joint was infected and was opened widely. Hemolytic streptococcus was obtained on culture. He improved gradually and left the hospital with a clean granulating wound 13 days after entry. Six weeks later the wound had closed and he was discharged from the Out Patient Department.

(8) E S No 328807 J F Three days ago engaged in the typical fist fight, this 15 year old patient received a cut on the left index knuckle. The following morning the finger became red and swollen. Movement of the joint became very painful. On entry an incision was made directly over the wound. A subcutaneous abscess, laceration of the extensor tendon, and tear in the joint capsule were found. The opening in the joint capsule was enlarged and the wound packed open. Smear of the pus revealed spirochetes. *Staphylococcus aureus* was recovered on culture. Hot boric soaks were given for 2 days, followed by warm boric dressings. An attempt at resuture was made on the ninth postoperative day, but the sutures had to be removed 4 days later. The patient was discharged on the thirteenth day.

(9) E S No 349998 W M Four days before entry this 28 year old man received a tooth laceration during a fight over the right middle knuckle. Four hours later it became painful. Progressive swelling appeared. No relief was obtained from various soaks. On examination at arrival he showed a dirty laceration with moderate edema of the dorsum of the hand. Thin, yellowish, foul pus oozed from the wound. In it a moderate number of spirochetes were demonstrated on smear. It was considered that the area infected was too large to be excised, so drainage was done with the scalpel rather than the cautery. A large subtendinous abscess was found. There was a tear in the joint capsule and a septic arthritis. The joint space was opened freely and packed lightly. 0.3 gm of neocarsphenamine were given the next day. A week later the temperature remained elevated at 101.5 degrees, and definite signs of web space infection appeared. The second and third spaces were incised. In another week tenosynovitis developed and osteomyelitis of the head of the metacarpal and proximal phalanx were seen by x ray. The finger was disarticulated at the metacarpophalangeal joint. The entire metacarpal slowly sequestered and finally was removed. Until the last of this bone was removed the discharge remained extremely foul. Aerobic culture revealed *Streptococcus hemolyticus* and *Staphylococcus aureus*. On anaerobic culture there were streptococci, gram positive and negative bacilli. The patient was discharged two months after entry. Active physiotherapy was continued in the Outpatient Department. Two months later the scar had contracted markedly. The patient could oppose his thumb to his other fingers and had a good hand except for moderate stiffness in the metacarpophalangeal joints.

(10) W S No 351190 S C This 21 year old man cut his right middle knuckle in a fight on his opponent's teeth 7 days before entry. The hand soon became tender and swollen. On the day after the accident, incision and drainage were done by the local physician. Despite frequent soaks the finger had not improved. When he came to this hospital the



incision had nearly healed but beneath it there was localized tenderness and swelling. Partial flexion of the finger produced pain. Exploration of the finger was done on the same day. An abscess was found in the subcutaneous space and a perforation through the capsule into a septic joint. The joint space was opened widely both dorsally and laterally by incisions in the web spaces. Dakin's tubes were inserted and irrigations begun on the following day. A smear of the pus showed no spirochetes. *Staphylococcus albus*, nonhemolytic streptococcus and diphtheroids appeared in culture. The incisions healed rapidly. A Thiersch graft was applied on the fifteenth day and he was discharged a week later. Two months later motion of the finger was nearly normal.

(11) E. S. No 326577. H. D. This 22 year old man had acquired a typical laceration 7 days before entry. It was treated at once by the local physician who sutured the wound and gave antitetanic serum. Three days later the sutures were removed because of infection. There was on entry, edema and tenderness surrounding a 2 cm laceration over the left index knuckle. Foul pus drained from it. The first web space and thenar space were markedly swollen. The hand was drained at once. The thenar space was opened by incisions in the first web space and in the palm. It contained a large amount of pus. A dorsal incision was then made over the infected knuckle, and the metacarpophalangeal joint widely opened. On culture *Staphylococcus aureus* and a gram negative spreader (probably *Bacillus proteus*) were obtained. The head of the metacarpal became progressively more necrotic and anterior luxation of the finger developed. On the tenth day the finger was amputated. He improved rapidly and was discharged on the twentythird day. The hand had healed when observed in the Outpatient Department one month later.

(12) W. S. No 333236. R. M. This 24 year old man cut his right index knuckle when he struck another man on the teeth 2 days before entry. He showed a small area of cellulitis about a laceration. Culture produced *Staphylococcus aureus*. Hot wet packs were applied for 6 days. At this time the infection had completely subsided.

(13) W. S. No 235724. G. H. Six days before entry this 14 year old boy struck another on the teeth and cut the skin over his fifth right knuckle. Two days later his axillary nodes became swollen. He developed a fever and vomited. Physical examination showed a laceration over the knuckle nearly healed. A firm, nontender node 4 cm in diameter was palpable in the axilla. There was no lymphangitis. After poulticing two days the axillary abscess was incised and drained. Nonhemolytic streptococcus was found on culture. Convalescence was delayed by lymphangitis of the upper arm. The patient left the hospital 13 days after entry and was discharged healed from the Outpatient Department.

### III. LATE CASES

(14) E. S. No 309515. H. J. This 22 year old Negro received a laceration over the left middle knuckle when he struck another's teeth during a fight 3 days before entry. Pain and swelling appeared in a few hours. He treated himself with iodine soaks and poultices. There was on entry a fluctuant swelling over the knuckle. Incision and drainage revealed a septic joint. The capsule was marsupialized to the skin and a Dakin's tube inserted. The bacteriologic report was *Staphylococcus aureus*. The patient was discharged in 16 days with the joint still draining. He reentered 2 weeks later with more profuse drainage. An x-ray showed osteomyelitis of the head of

the metacarpal. It was decided not to amputate. Five days later the discharge had diminished considerably. He left with his finger in traction, and failed to return to the Outpatient Department.

(15) E. S. No 325363. J. M. A 24 year old man 10 days ago struck another in the mouth cutting his third left knuckle. Pain and swelling developed shortly afterward. The wound began to discharge thin foul pus. For 8 days he was treated by various doctors with hot soaks and salves. He showed on admission to the hospital an area of cellulitis about 5 cm in diameter about the cut. The finger was swollen, and motion of the metacarpophalangeal joint was limited. An incision was made over the laceration. The extensor tendon had sloughed away entirely, and a rent was found in the joint capsule. It was opened widely. Nonhemolytic streptococcus was obtained on culture. Improvement was rapid, and the patient was discharged in 10 days with the wound clean. One month later the incision had healed and the patient left the Outpatient Department.

(16) W. S. No 310878. M. B. This woman's epileptic husband bit her right index finger 13 days before entry during a seizure. She received lacerations both anteriorly and posteriorly just proximal to the distal interphalangeal joint. A doctor was called at once. He applied mercurochrome and advised soaks. Infection was noted a few days afterward. On arrival in the hospital she presented a swollen finger and dorsum of the hand. There was tenderness over the second lumbrical space. Active movements of the finger were impossible and passive painful. A smear showed many spirochetes and fusiform bacilli. Exploration was done at once. The second web space was incised. Pus extended distally to the original laceration. The extensor tendon had been severed, and the flexor tendon sheath was necrotic over the proximal phalanx. Three doses of arsphenamine (0.45 gm) were given at weekly intervals. The wound drained profusely, discharging necrotic tendon. Nine days later the finger was amputated through the midportion of the proximal phalanx. Osteomyelitis was present in all the phalanges. A small abscess of the stump was opened 5 days later. The temperature became normal thereafter. Pinpoint grafts were applied 3 weeks later and she was discharged to the Outpatient Department a month later. Six months later her hand was useful except for slight local tenderness over the inner end of the stump.

(17) W. S. No 343516. A. K. Three weeks ago this 27 year old man was bitten near the tip of his right middle finger during a fight. Four days later he had incision and drainage in another hospital. Thereafter he was treated expectantly. The patient entered with osteomyelitis of the two distal phalanges and marked infection of the soft parts. The distal phalanx was dislocated medially. Amputation was done through the proximal third of the first phalanx. He was discharged 6 days after entry. A month later the wound had nearly closed.

(18) W. S. No 290131. B. T. This 19 month old baby had his hand bitten by a man one and a half months before admission. It was treated with ointments and later by small incisions. Cellulitis appeared intermittently until entry. At this time the infection covered the dorsum of the hand. It subsided rapidly with flaxseed poultices. He was discharged entirely relieved 6 days later.

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discharged in 3 days with a clean granulating wound. One month later the patient was last seen in the Outpatient Department at that time the incision had nearly closed.

## II DELAYED CASES

(4) E S No 324120 A. L. Twenty hours before entry this 13 year old boy cut his right fourth knuckle on his brother's teeth during a fight. Five hours later the hand became painful and was soaked without relief. On entry he showed a 1 cm wound which discharged thin pus. With the scalpel the laceration was explored. It did not extend into the joint but could be followed into the third web space. This was opened widely. *Streptococcus viridans* and a gram positive bacillus grew on culture. Boric packs were given postoperatively. Eight days later the white count had dropped from 26,000 to 10,000 but the temperature continued to rise to 100 degrees. The finger was amputated at that time just proximal to the head of the metacarpal. The specimen showed a chronic osteomyelitis and roughening of the surfaces of the metacarpophalangeal joint. Healing was rapid and the patient was discharged 10 days later to the Outpatient Department. The hand had healed one month later.

This patient, in view of our later experience would not have lost his finger if the primary incision had been with the cautery, and if the joint capsule had been opened at once.

(5) E S No 331262 G. T. This 21 year old man, fighting on the night before entry, cut his right middle knuckle on the tooth of his adversary. He at once soaked his hand in creolin, and applied iodine. Shortly afterward he went to a relief station where a salve was applied. He arrived here with a 1.5 cm laceration across the knuckle with a slight degree of surrounding cellulitis. With the diathermy an incision was made. The joint space was found to be infected and was opened. *Micrococcus catarrhalis* and nonhemolytic streptococcus grew on culture. The purulent discharge failed to subside. 0.45 gm of neoarsphenamine were given a week after the primary operation. Two hourly sodium perborate soaks were employed. Eleven days after the first operation a second exploration revealed complete separation of the extensor tendon and a purulent arthritis. The finger was disarticulated. *Staphylococcus aureus* was obtained on culture at that time. Improvement was rapid. The patient was discharged in 11 days. He was seen a month later in the Outpatient Department at that time the wound had practically healed.

Failure in this case was due partially to the patient's delay, partially to the fact that the infected tract was incised, rather than excised.

(6) E S No 326806 C. H. This 22 year old girl hit her companion in the mouth with her right index knuckle 2 days before entry. She was seen in another hospital the day after she received the laceration soaks were advised. On entry here she presented the usual laceration and cellulitis. The wound was opened widely and the edges of a ragged cut perforating the tendon were excised. No gross infection of the joint could be demonstrated so the capsule was not opened. Boric acid and sodium perborate soaks were given alternately every hour for 2 days. On culture *Streptococcus viridans* and a gram positive bacillus were obtained. Granulations appeared rapidly. Secondary suture was done on the ninth day and the patient discharged 4 days later.

(7) E S No 346564 G. W. This 17 year old boy struck a companion on the teeth 3 days before

entry. Twenty four hours later the finger became swollen and painful. Boric soaks gave no relief. He showed, on arrival, a dirty laceration over the third knuckle of the right hand with surrounding cellulitis. Thin, foul pus was draining from the incision. A wide cautery excision was done. The extensor tendon had not been injured but the joint was infected and was opened widely. Hemolytic streptococcus was obtained on culture. He improved gradually and left the hospital with a clean granulating wound 13 days after entry. Six weeks later the wound had closed, and he was discharged from the Out Patient Department.

(8) E S No 328807 J. F. Three days ago engaged in the typical fist fight, this 15 year old patient received a cut on the left index knuckle. The following morning the finger became red and swollen. Movement of the joint became very painful. On entry an incision was made directly over the wound. A subcutaneous abscess, laceration of the extensor tendon and tear in the joint capsule were found. The opening in the joint capsule was enlarged and the wound packed open. Smear of the pus revealed spirochetes. *Staphylococcus aureus* was recovered on culture. Hot boric soaks were given for 2 days, followed by warm boric dressings. An attempt at resuture was made on the ninth postoperative day but the sutures had to be removed 4 days later. The patient was discharged on the thirteenth day.

(9) E S No 349998 W. M. Four days before entry this 28 year old man received a tooth laceration during a fight over the right middle knuckle. Four hours later it became painful. Progressive swelling appeared. No relief was obtained from various soaks. On examination at arrival he showed a dirty laceration with moderate edema of the dorsum of the hand. Thin, yellowish, foul pus oozed from the wound. In it a moderate number of spirochetes were demonstrated on smear. It was considered that the area infected was too large to be excised, so drainage was done with the scalpel rather than the cautery. A large subtendinous abscess was found. There was a tear in the joint capsule and a septic arthritis. The joint space was opened freely and packed lightly. 0.3 gm of neoarsphenamine were given the next day. A week later the temperature remained elevated at 101.5 degrees and definite signs of web space infection appeared. The second and third spaces were incised. In another week tenosynovitis developed and osteomyelitis of the head of the metacarpal and proximal phalanx were seen by x ray. The finger was disarticulated at the metacarpophalangeal joint. The entire metacarpal slowly sequestered and finally was removed. Until the last of this bone was removed the discharge remained extremely foul. Aerobic culture revealed *Streptococcus hemolyticus* and *Staphylococcus aureus*. On anaerobic culture there were streptococci, gram positive and negative bacilli. The patient was discharged two months after entry. Active physiotherapy was continued in the Outpatient Department. Two months later the scar had contracted markedly. The patient could oppose his thumb to his other fingers and had a good hand except for moderate stiffness in the metacarpophalangeal joints.

(10) W S No 351190 S. C. This 21 year old man cut his right middle knuckle in a fight on his opponent's teeth 7 days before entry. The hand soon became tender and swollen. On the day after the accident incision and drainage were done by the local physician. Despite frequent soaks the finger had not improved. When he came to this hospital the

A number of urines from normally menstruating women produced corpora lutea. This may not be interpreted as indicating the presence of luteinizing hormone (L H) in the extract since the rats own hypophyses may have been stimulated to secrete L H by the estrin of their ripening follicles.<sup>12</sup>

women are given in chart 1. One was followed during four cycles, two of which were consecutive. The other was studied during two consecutive cycles. Urines were collected at least twice a week and generally more often. Results are expressed in terms of rat units per

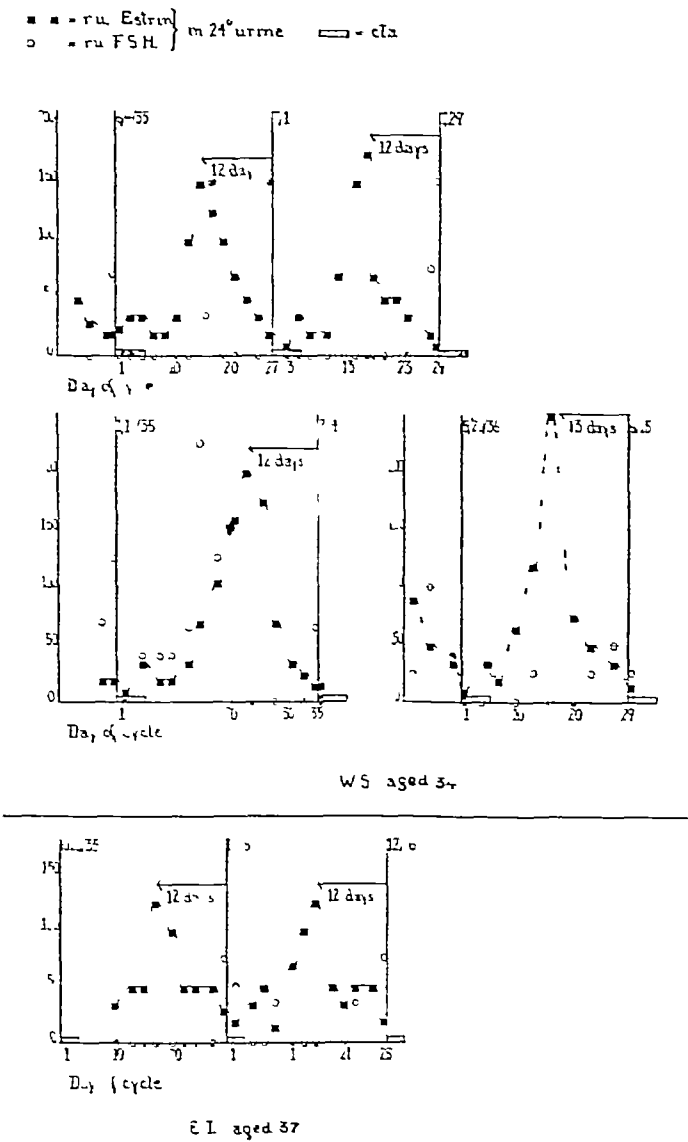


CHART 1  
Normal Menstrual Cycles  
Estrogenic and Gonadotropic Potency of 24 Hour Urines  
Abscissa—day of cycle  
Ordinate—rat units in 24 hour volume of urine.

When pregnancy was suspected the animals were explored at 96 hours. The smallest amount of urine which resulted in the appearance of grossly visible corpora lutea at this time was considered 1 rat unit of A.P.L.

NORMAL MENSTRUAL CYCLES

The curves of excretion of estrin and the FSH findings on two normally menstruating

24-hour volume\*. The values for individual specimens are shown in solid squares for estrin

\* Assays for estrogenic potency have been performed by the Allen Dols method, as many rats being employed as the amount of hormone in a given extract permitted. By this technique with our strain of rats one-tenth of a gamma of crystalline estrone (the international unit) has been found equivalent to 0.35 rat units. We have not thought it advisable however to express results in terms of international units since our extracts both from pregnant and nonpregnant women contain estrone (theelin, trihydroxyestrin) and estradiol (theelol, ketohydroxy-estrin) in varying proportions.

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## THE URINARY EXCRETION OF ESTROGENIC AND GONADOTROPIC HORMONES DURING MENSTRUAL CYCLES, THE PERIOD OF CONCEPTION AND EARLY PREGNANCY\*

BY GEORGE VAN S SMITH, M D,† AND O WATKINS SMITH, PH D †

IN a previous communication<sup>1</sup> we described a method for determining the estrogenic potency of human urine. It involved rapid acid hydrolysis followed by continuous extraction for 24 hours with benzene (benzol). Acid hydrolysis has been conclusively demonstrated<sup>2, 3, 4, 5, 6</sup> to be an essential step in the quantitative determination of urinary estrin. That benzene, as employed in this method, extracts all the "free" estrogenic substances present after hydrolysis we have repeatedly been able to confirm. Recent experiments have indicated, however, that a revision in the technic of hydrolyzing specimens will make it possible to recover even more estrin than is accomplished by the method as originally described. The following data were acquired before this fact was discovered. Although we now realize that the values for "total" estrin as given below do not represent all of the hormone present, they are considerably higher than those reported by others<sup>7, 8, 9, 10</sup> and the uniformity of the curves makes them appear to be of physiologic significance in the processes studied, that is, normal menstruation, conception and beginning pregnancy.

The commonly used methods for concentrating gonadotropic factors<sup>†</sup> from urine have been tried in this laboratory. Much time has also been spent in attempting to originate some more satisfactory procedure. Our present conclusion is that no method now available gives reliable values when applied to urines from the nonpregnant. This is not surprising, since the gonado-

tropic factors have not been isolated in pure form as have the estrogenic. Hence, recovery experiments are fruitless because it is impossible to know at the outset how much gonad stimulating substance is actually present. We have frequently demonstrated more than 200 rat units of FSH per 24-hour volume in the urines of normally menstruating women, but at no consistent point in the cycle. By no method yet tried by us or reported in the literature has it been possible to obtain uniform or comparable curves for FSH throughout normal menstrual cycles. The sporadic finding of large amounts of FSH leads us to believe that, in the majority of urines, much of the material is either bound in an inactive form or combined in some manner with substances which are not recovered by the process of concentration. The figures, then, for FSH in the accompanying charts are presented with reservations as to their accuracy or significance. For the determination of APL, however, both alcohol precipitation, as outlined below, and the Katzman Doisy<sup>11</sup> technic have been found to give consistent curves, if not quantitative yields.

All of the values for gonadotropic substances in the charts were acquired in the following manner: five volumes of alcohol were added to aliquot portions of fresh 24-hour urines of pH 6.0 to 6.6. After standing in the refrigerator overnight the mixtures were centrifuged. The precipitates were washed with ether and suspended in 6 cc of normal saline solution. One cc was then injected morning and night for three days into nineteen to twenty one day old female rats. In assaying the urines of nonpregnant women the vaginas were opened 96 hours after the first injection, smears taken at 104, 120 and 128 hours and the animals explored at 144 hours for any gross effect on uterus or ovaries. The smallest amount of urine which, after being freed of estrin by the above extraction, produced estrous smears was considered 1 rat unit of FSH.

\*From the Fearing Research Laboratory Free Hospital for Women Brookline Mass. The Mrs William Lowell Putnam Investigation of the Toxemias of Pregnancy.

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†The gonadotropic factor excreted in the urine of nonpregnant individuals which is of pituitary origin and is also called prolactin A will be referred to as FSH, the follicle stimulating hormone. The gonadotropic hormone of the urine of pregnancy which differs in its biologic activities from the above and which is of placental origin will be called APL, the anterior pituitary like gonad stimulating substance.

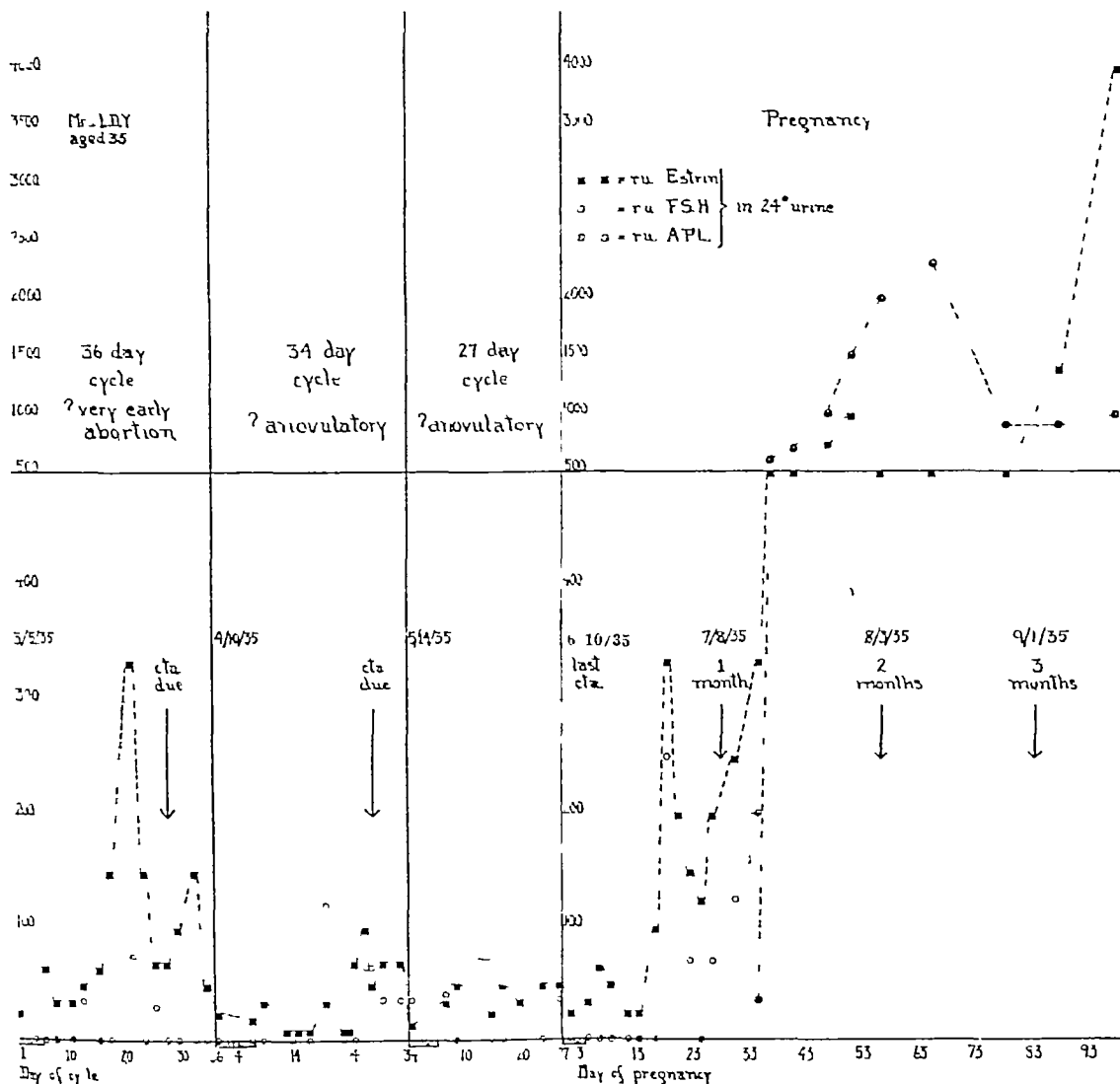


CHART 2  
Mrs. L. D. Y. Three Menstrual Cycles, the Period of Conception  
and Early Pregnancy  
Estrogenic and Gonadotropic Potency of 24 Hour Urines  
Abscissa—day of cycle and of pregnancy  
Ordinate—rat units in 24 hour volume of urine

est level of estrin occurs twelve days before the onset of the next catamenia, probably at the time of the fully mature corpus luteum, that menstruation is associated not only with a low level of estrin but also with increased pituitary gonadotropic activity, and that this augmented appearance of FSH is reflected early in the cycle by a slight rise in estrin, probably from a ripening follicle

#### CONCEPTION AND EARLY GESTATION

Two volunteers supplied urines during the period of conception and early pregnancy. One (chart 2) collected specimens for three months before becoming pregnant and throughout gestation. The analyses after the third month are

included in another publication<sup>10</sup>. The other (chart 3) was studied for only seventeen days before her last catamenia.

Mrs. L. D. Y. (chart 2) had had regular twenty-eight day cycles to March 1935 when she decided to have a baby and offered her cooperation. Her first curve of estrin excretion is similar to those in chart 1 until the time when her period was due. A secondary rise between the twenty-seventh and thirty-third days and a consequent drop were followed by a profuse flow which came nine days late. The April and May cycles lasted thirty-four and twenty-seven days respectively and failed to show the pronounced peak in urinary estrin so characteristic of normal cycles. The last catamenia began on June 10. During this month of conception the curve for estrin is strikingly like that of March until the thirty-third day after which it continued to go upward. We interpret these phenomena as indicating that a very early abortion took place

and hollow circles for FSH. A cross in the FSH circle indicates that corpora lutea were found at the time of exploration. The values for estrin seemed sufficiently uniform to justify their being connected by dotted lines to make the charts more clear.

The figures for FSH during different cycles, even with the same individual, were variable. During the January, 1935, cycle on WS, for example, 9 out of 14 tests gave positive results, whereas, during another similar period, July, 1935, only 2 of 13 assays revealed FSH. Both positive and negative tests were found at all times during normal cycles. The hormone was consistently demonstrable *only* immediately preceding the onset of menstruation. Schorcher and Zondek,<sup>13</sup> working with mixed samples of urine, also found a maximum excretion of FSH just before menstruation. The frequency of this observation of the presence of excreted FSH in relation to bleeding throughout all our studies of both normal and abnormal flowing<sup>14</sup> leads us to believe that it is of physiologic significance.

The shapes of the curves representing excretion of estrin are remarkably similar, although the actual amounts vary moderately. In every instance, regardless of the length of the cycle, maximum excretion occurred on the twelfth or thirteenth day preceding the onset of menstruation. Chart 3 also shows a peak in excretion of estrin twelve days prior to the onset of the last catamenia before conception. The normal cycle included in a previous publication<sup>1</sup> has its peak thirteen days preceding menstruation but the values are considerably lower than those herein reported, due to the use of ethyl acetate rather than benzene as an extracting agent. In 1932 results<sup>15</sup> were published on the urinary excretion by women of orally administered estrin. At that time unhydrolyzed and unextracted urines were assayed. In spite of the crude test, positive excretion—in the two normal cycles followed—began between the eleventh and fourteenth days before bleeding. These days coincide with the time of the mature corpus luteum. In 1931 the hormone<sup>16</sup> of the corpus luteum, progesterin, was found to be associated with increased excretion of injected estrin in rabbits. Assuming that the development of a functioning corpus luteum is preceded by ovulation and that the highest levels of urinary estrin appear when the corpus luteum is mature, the curves in chart 1 indicate that normal menstruation occurs at a constant interval following ovulation.

A small peak in the excretion of estrin may be noted during or just after menstruation. It was also observed in three cycles in which the later, more marked, peak was absent and which we considered anovulatory, two of these are

included in chart 2. This postmenstrual rise in urinary estrin seems to be associated with the actual flow and may be an afterlude—follicle ripening with production of hormone—of the increased gonadotropic activity made evident by the almost consistent finding of urinary FSH at the onset of bleeding.

Maximum excretion of estrin midway between menstruations and minimum just before have been reported.<sup>17, 18</sup> Curves differing entirely from each other and from those in chart 1 have also been presented.<sup>7, 8, 9</sup> The contradictory results would seem to be due to failure to hydrolyze before extraction, an omission resulting not only in less recovery but also in misleading figures.<sup>1</sup> In these publications a total excretion of from 1,200 to 4,000 mouse units of estrin throughout a complete cycle is reported. According to our figures, 1,500 to 3,000 rat units that is 7,500 to 15,000 mouse units, are excreted during a cycle and even higher totals may be expected through further refinement in the method of hydrolysis.

Due to the impracticability of collecting blood samples frequently enough or in sufficient amounts to secure complete curves or accurate bio assays, we have made no attempt to discover whether the urinary values for estrin run parallel to the blood level. During pregnancy<sup>19</sup> the urinary and serum estrin follow similar curves. Recently<sup>20</sup> it has been shown that the degree of genital swelling in chimpanzees varies with the urinary excretion of estrin, the maximum excretion and the most marked swelling coinciding midway between the onset of catamenia. Fluhmann's<sup>21</sup> analyses of weekly specimens of serum from women with normal cycles run fairly parallel with our urinary findings, maximum values occurring early in the second half of the cycle and often a less marked peak during menstruation itself. He also reports, however, an occasional rise in serum estrin one to four days preceding the flow. Frank<sup>22</sup> records high serum estrin for seven days preceding menstruation. In the three presumably anovulatory cycles followed by us, a slight rise in urinary estrin preceded bleeding by three to five days, but the values in these cases fluctuated throughout the cycle. The lack of uniformity of Fluhmann's curves, as well as the occasional apparent rise in serum estrin late in the cycle, may well be due to the fact that samples of blood were taken only once a week, the real peak in some instances having been missed. From the evidence at hand, though meager, we are inclined to feel that there is no renal threshold for estrin, that the urinary values may be taken as a gauge of the level in the blood and that increased excretion signifies increased production and/or decreased destruction of circulating estrogenic factors.

The material presented in chart 1, therefore, together with the above considerations, suggests that in normally menstruating women the high-

Seven days after menstruation was due, A.P.L. was identified in the urine. It reached its peak on the sixty-fifth day and then dropped to a lower level at which it remained throughout gestation. This curve agrees with those of Browne and Venning,<sup>3</sup> although our actual values for A.P.L. are not so high as theirs, due to the fact that we use luteinization rather than follicle-ripening as an end-point. They also analyzed for estrin daily specimens of urine from one subject and report a cyclic excretion of this hormone during pregnancy with peaks every twenty-four to twenty-nine days. The estrin curve for Mrs. L. D. Y.'s second month suggests a cyclic change. After this time, however, urines were not collected frequently enough to reveal such a phenomenon had it occurred.

The most striking feature of the curves for the third and fourth months is the relation between estrin and A.P.L. Coincident with the greatest A.P.L. excretion the level of estrin flattened out and then continued upward immediately after the drop in A.P.L. We have frequently been impressed by the mutually antagonistic action of these two factors upon each other.<sup>19</sup> Furthermore it is interesting that this antagonism is not evident until after the seventh week.

Mrs. Y. B. (chart 3) gave a history of two spontaneous abortions each in the second month. Her catamenia had been irregular coming four to six weeks apart. Analyses for the seventeen days preceding her last menstruation revealed a normal curve of estrin excretion with a maximum twelve days before the onset. Among the occasional positive tests for FSH was one two days before flowing started. The only coitus during the month of conception was on the twelfth day. The curve for estrin practically duplicates that in chart 2 the secondary rise coming immediately after the twenty-fifth day. The Aschheim-Zondek reaction (A.P.L.) was given suddenly on the twenty-ninth day the urine having been negative forty-eight hours before. A.P.L. reached its peak on the sixtieth day and struck its lower fairly constant level by the sixty-seventh day. The A.P.L. findings on these two cases therefore are in close accord with those of Browne and Venning who found their highest values in five pregnant women between the fifty-second and sixty-fourth days. The analyses for estrin in chart 3 with peaks every twenty-eight days are also confirmatory of their report of cyclic excretion. Chart 3 again illustrates the antagonism between A.P.L. and estrin and in this instance the amount of estrin actually fell away while the A.P.L. wave was at its highest.

#### SUMMARY

Methods for the determination of estrogenic and gonadotropic substances in the urine of non-pregnant and gravid individuals have been discussed. The techniques adopted in the present investigation have yet to be improved and are too time consuming to permit a careful study of more than a limited number of cases. The

results, however, are sufficiently uniform in certain respects to make them seem of physiologic significance.

Urinary excretion of estrogenic and gonadotropic factors has been followed in two women during six normal menstrual cycles and in two other women before, during and after the month of conception.

In normal cycles the excretion of estrin showed uniform curves, a slight rise being apparent during or just after menstruation and a marked peak being demonstrable twelve or thirteen days preceding the next catamenia. This last finding supports the theory that, regardless of the total length of a cycle, menstruation occurs at a definite time after ovulation and luteinization.

Tests for FSH in nonpregnant women have been found variable and apparently of no quantitative significance, but they have been consistently positive just before bleeding. The increased estrin output early in the cycle may be a reflection of this gonadotropic activity associated with the onset of flow.

The findings on one individual, who was studied for three months before the cycle of conception have been interpreted as indicating the occurrence of a very early abortion succeeded by two anovulatory cycles. Certain cases of sterility characterized by late and profuse catamenia may be having such very early abortions.

In two women, analyses during the period of fertilization were practically identical. There was an estrin curve similar to the nonpregnant until the twenty-fifth day then a rise instead of a drop in excretion of estrin and soon thereafter the presence of A.P.L. It would appear that the increased output of estrogenic and gonadotropic substances by the mother which is typical of gestation does not commence until at least eight days after fertilization, probably immediately upon implantation of the ovum.

A.P.L. reached its peak in these two early pregnancies on the sixty-fifth and sixtieth days, respectively, and then decreased to a lower level which was maintained during the course of this study. Although estrin continued to attain higher levels from the twenty-fifth day on, cycles of excretion were definitely evident in one case with peaks every twenty-eight days.

A striking feature of both pregnancy charts is the roughly inverse ratio between A.P.L. and estrin after the seventh week.

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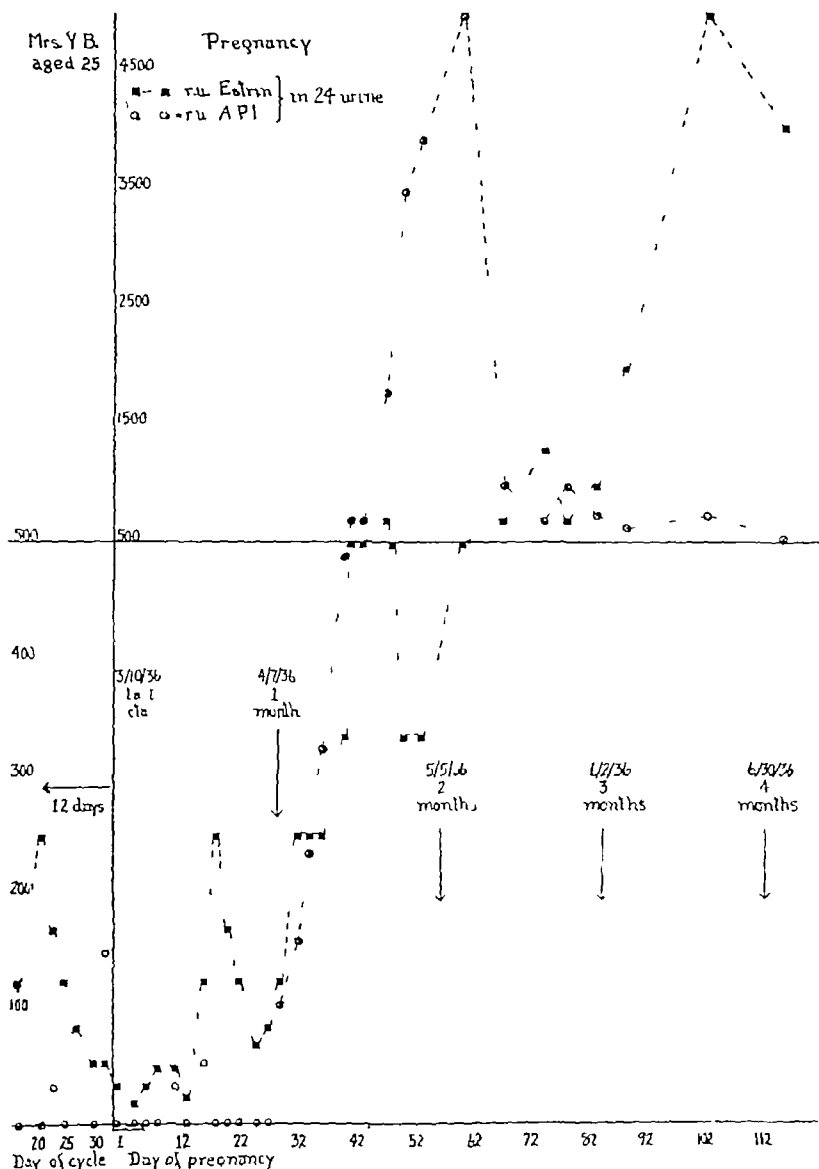


CHART 3

Mrs. Y. B. One Menstrual Cycle the Period of Conception and Early Pregnancy

Estrogenic and Gonadotropic Potency of 24 Hour Urines

Abscissa—day of cycle and of pregnancy

Ordinate—rat units in 24 hour volume of urine

in March and was succeeded by two anovulatory cycles. It may be that early abortions are more common than is generally recognized especially in women who complain of barrenness and whose periods frequently come late and are rather profuse. The administration of progestin would be the logical treatment in such cases. Tests for FSH were again inconsistent except for the positives prior to the periods of May 14 and June 10. The failure to find FSH in the urine before the April period may be further evidence that this flow represented an abortion rather than true menstruation. APL, originating in the trophoblast has been found to cause the disappearance of FSH in the urine of women with menorrhagia.<sup>14</sup>

The figures for estrin during the month of conception are of considerable theoretical inter-

est. Fertilization was presumably accomplished between the twelfth and sixteenth days of the June cycle. One might have predicted a continued increase in estrin from this time on. However, up to the twenty-fifth day the curve is entirely similar to that of a typical normal cycle. The secondary rise in estrin excretion after the twenty-fifth day signifies, we think, the completion of successful implantation with the subsequent appearance in the maternal circulation of trophoblastic hormones. If this interpretation is correct, one must conclude that from the time of nidation the products of gestation, rather than the ovary, are the source of estrin.



a negative finding. A reaction of 3 (blue) is reported as weak of 4 (pale blue) as moderate and of 5 (decolorization) as strong.

## RESULTS

**Pressure** The pressure readings were considered as reliable in 133 patients (table 1).

TABLE 1

THE CEREBROSPINAL FLUID PRESSURE IN 133 PATIENTS WITH ACUTE ALCOHOLISM

Pressure (in mm. of CSF)	Number of Patients	Per Cent
Less than 180	100	75
180 to 200	15	11
200 to 300	17	13
300 to 400	1	1
Total	133	100

They were below 180 mm. of cerebrospinal fluid in 100 patients or 75 per cent, and above 180 mm. in 33 patients or 25 per cent. Only 1 patient had a pressure above 300 mm.

**Cells** Cell counts were recorded in 111 patients. The count was below 5 per cmm. in 87 per cent and below 10 per cmm. in 95 per cent. Three fluids (2 per cent) had between 10 and 19 cells per cmm.

**Protein** The protein determinations were made in 146 fluids (table 2). The results varied

TABLE 2

THE CEREBROSPINAL FLUID PROTEIN CONTENT IN 146 PATIENTS WITH ACUTE ALCOHOLISM

Protein Content (mg. per 100 cc.)	Number of Fluids	Per Cent
13 to 45	117	80
45 to 75	26	18
75 to 91	3	2
Total	146	100

between 13 mg. and 91 mg. per 100 cc. with an average of 35 mg. They were below the accepted upper limits of normal, namely 45 milligrams per 100 cc. of fluid in 127 or 80 per cent and greater than 45 in 29 or 20 per cent.

**Colloidal Gold** The colloidal gold reaction was determined on 148 fluids. A negative test was obtained in 136 fluids, a weak first zone curve in 2, a weak mid zone curve in 5, and a moderate mid-zone curve in 1 fluid. There were therefore 136 or 95 per cent negative gold sol

reactions and only 8 or 5 per cent pathologic reactions.

## DISCUSSION

Abnormal findings in the fluids from patients with chronic and acute alcoholism are almost entirely confined to an increase in pressure (25 per cent from 133 patients) and an increase in protein (20 per cent from 127 patients). Since lumbar puncture is one of the more important diagnostic procedures in patients admitted to hospitals in coma, it would seem important to emphasize the fact that these abnormalities may be found in alcoholics.

The mechanism of the increase in pressure is readily understood. It is due chiefly to the cerebral edema ("wet brain") and in part to the dilation of the cerebral vessels produced by the alcohol.

The increase in protein is more difficult to explain. It is possibly due to an increased permeability of the choroidal and meningeal vessels to protein as a result of injury to these vessels by the alcohol or possibly to degenerative changes in the parenchyma and nerve roots produced by the alcohol.

## SUMMARY

Although the cases herein reported are not so carefully classified as could be desired, our results indicate that the cerebrospinal fluid from patients with acute and chronic alcoholism may occasionally be abnormal. The significant deviations from the normal are as follows:

1. An increased pressure in 25 per cent.
2. An increased protein content in 20 per cent.

The occurrence of any abnormality in the cerebrospinal fluid of alcoholics should make one seriously consider the possibility of the presence of other causes for the abnormality, such as subdural hematoma, brain tumor, syphilis of the nervous system and so forth. Only after such other causes are excluded should the abnormalities in the fluid be attributed to alcoholism.

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## THE CEREBROSPINAL FLUID IN ACUTE ALCOHOLISM\*

BY M. ROSENBAUM, M.D.,† R. Y. HERREN, M.D.,† AND H. H. MERRITT, M.D.†

### INTRODUCTION

RECENT interest in the chemical and physical aspects of cerebrospinal fluid has revealed some very illuminating academic and clinical results. The pathologic phenomena are being broadened almost daily but occasionally in routine clinical examinations abnormal results are obtained when the systemic condition under observation does not seem to link up readily with the aberrant findings. Such has occasionally been our experience in the routine examination of the cerebrospinal fluid from patients with chronic and acute alcoholism. We, therefore, thought it would be of value to review the results obtained on the fluids examined at the Boston City Hospital during the past few years.

A search of the literature reveals only one similar report. Courtois and Pichard<sup>1</sup> report their observations on 100 cerebrospinal fluids. Their patients included 87 acute alcoholics with confusion, delirium and memory loss, 9 with "alcoholic fits", and 4 cases with polyneuritis, 2 of whom exhibited Korsakoff's syndrome. They report "modifications are rare and of little importance." Globulin reactions were constantly negative and cellular reactions normal. Twenty-five per cent of the fluids from their chronic alcoholics gave a meningitic type of reaction in the colloidal benzoin test. Pressures were measured in the sitting position and are therefore of no value.

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### MATERIAL AND METHODS

The cases in our present report cannot be classified beyond saying they were all cases of chronic alcoholism with acute exacerbation which led to hospitalization. The great majority were admitted in coma. Patients with mental symptoms were included, but patients with alcoholic neuritis were not included unless they were admitted in coma. In the past few years the fluids from 201 patients of this type have been examined. It was necessary to exclude from these 201 all fluids that were contaminated with blood as the result of faulty technique or of a previous head injury, all fluids with a positive Kahn test and all fluids with abnormalities similar to those found in the fluids of patients with syphilis of the central nervous system but in which no serologic test for syphilis was recorded.

The punctures were performed in the lumbar region with the patient in the lateral recumbent position. The Fremont-Smith modification of the Ayer spinal puncture needle and manometers were used. All pressure readings were discarded unless a note was made to the effect that the patient was relaxed and the measured pressure was a reliable one. The cells were counted in an ordinary blood counting chamber after the fluid had been lightly stained with Unna's polychrome methylene blue. The protein determinations were made according to the Ayer, Dailey and Fremont-Smith modification<sup>2</sup> of the Denis and Ayer method. The colloidal gold reaction was done according to the method of Lange, as described by Cockrill.<sup>3</sup> For the purposes of this report a reaction of less than 2 (lilac) in any tube is reported as

It is interesting, if you ever happen to get into a boudoir, to note the various bottles. It would take a chemical detective to find out what is in them. These concoctions are planned to make the modern female resemble Venus. As you look about, you will become convinced that a great portion of the money they cost is wasted! I think we may save with a reasonable amount of security (not social security, but ordinary security) that there would not be sold one and a half billion to two billion dollars' worth of cosmetics, were it not for the fact that one-third of the total amount of money is spent on selling the cosmetics. One-third of the total cosmetic budget is spent on advertising cosmetics to the American women. Back in Cleopatra's days, the formulas were much the same. The stuff cost less, but it didn't do any more than it does now!

The woman of 1890 wore cotton stockings. In 1919, we had one pair of silk stockings for every 2,000 women in the population. Nowadays they make them so thin and they wear out so quickly that the average woman requires a pair a day in order to keep up with the wear and tear.

The young woman in an office today is using a typewriter, a stenotype, a comptometer, book-keeping machine, addressograph machine, an intercommunicating office phone, a telephone or some of the other 'phoney' things that have come into business to make life what it is.

Back in 1890, our business man went home to dinner, now he goes to lunch at noontime and dinner has been moved to seven o'clock in the evening since Emily Post moved into the social picture. Perhaps he goes to a luncheon club, where he hears an orator speak on some topic of interest to the American public. In the old days when the man came home to dinner, he rested. When six o'clock came he had his supper, consisting of meat, potatoes, pie and coffee or tea, and then he and his wife played cribbage, while the daughter murdered some Beethoven or Bach on the piano. When nine o'clock came, they went to bed, considering that they had spent a fine day and evening. That was the whole story of life. It was easy-going, quiet and not so disturbing in 1890.

Contrast that with the average life of today. I am not speaking about the people in the top layers of society, but the average life of today.

The average American goes down to work today, not afoot, but in a motor car. Previous to 1900 there were no motor cars. Then the motor cars came in, and as they began to be purchased in larger and larger numbers, more and more people began to buy them. Today, as many of you know, we do have, not a motor car for every 100,000 people or every 5,000 people as they have in many foreign countries but a motor car for every four and a half people

in the United States. And we have a change in the list of causes of death. The motor car did not appear in the list of causes of death in 1904, but today the motor car is tenth on the list of causes of death, accounting for 36,000 people every year. Right alongside the motor car deaths are those from diabetes. But if you tell the average man that he is likely to die of diabetes, he becomes worried and comes to the doctor's office carrying his little package. However, if you tell him he will die of a motor car accident, that doesn't disturb him in the least, for he recognizes that there are only two classes of people left, the quick and the dead.

After he gets to his office in his motor car, he sits down and works with all the mechanical devices that we have in offices nowadays. After lunch he works for an hour or two, then goes out to a golf course if the weather is propitious. In 1920 there were 700 golf courses, today there are 8200 golf courses two without mortgages!

After he gets through with his golf game, perhaps he comes home and gets dressed ready to go out somewhere to dinner. Perhaps while his wife is getting dressed he turns on the radio. Back in 1900, there were no radios. Nowadays, we spend \$3,000,000,000 a year on radios, musical instruments and saxophones. This represents an expenditure which formerly did not occur in the American budget.

Let us see why Americans do not have sufficient funds to meet their emergency sickness bills. We have an annual budget in the United States of approximately one hundred billion dollars. Incidentally the largest single item in the American budget is seventeen billion dollars for food. The total advertising bill for selling this seventeen billion dollars' worth of food is less than the total advertising bill for selling a billion and a half to two billion dollars worth of cosmetics!

Twelve billion dollars represent the sums spent on motor cars, automotive parts and gasoline, four billion dollars represent the sums spent on used cars and automotive parts and four billions for gasoline. These amounts also, we did not have to concern ourselves with back in 1890.

After our man has listened to his radio for a while, he goes to dinner, then he and his wife may go out and play bridge. In the good old days, they played casino, and sometimes they even played whist! In 1920, we were using 10,000,000 packs of cards, but when Professors Culbertson and Sims came into the picture, we began using more and more decks of cards, until today, we use 80,000,000 decks of cards each year in the United States. Bridge is a sixty million dollar business.

After our man and his wife of today have played their bridge game, they may go out to

## NEW HAMPSHIRE MEDICAL SOCIETY

## MEDICINE IN THE CHANGING SOCIAL ORDER\*

BY MORRIS FISHBEIN, M D †

*Mr. Toastmaster, Members of the New Hampshire Medical Society, Ladies and Guests*

I AM always delighted to be introduced by a toastmaster of such proficient attainments as the one we have here this evening. He makes me think of a fine piece of statistical knowledge which I accumulated recently: "If all the toastmasters in the world were laid end to end, it would be a — good thing!"

It is a great pleasure for me to be here again in New Hampshire, as it was when I attended a meeting here in 1928. It is a pleasure to see before me so many friendly faces of people whom I learned to know at that time. But, even did I not have this old home feeling by the sight of all of you whom I know so well before me, I would feel distinctly at home in the presence of the ancient anecdotes! It has seemed to me that I have heard them before, or perhaps read them in my own column on various occasions!

In fact, when your toastmaster got started on that one about the Chinaman, "You likee talkee," I thought he was going to give us that one about the woman who was sitting next to the elderly man who was hard of hearing. She thought she would make some conversation with him, so she said, "Do you like bananas?" He turned to her and said, "No, I still wear the old-fashioned nightshirts!"

I shall leave the subject of the Toastmaster with those few remarks, and embark, now, on the topic of my discourse, which is "Medicine in the Changing Social Order." This is a rather profound and difficult topic, as you may well imagine. But do not let the title dismay you. Bill Nye was asked to address a group one time, so he wrote and asked them on what subject he should speak. He sent six or seven subjects and said, "Choose any subject you want. It won't make any difference because it will be the same speech, no matter which subject you choose!"

The story of medicine and the changing social order is one of the greatest importance to all of us. It is necessary that we have some idea of changes that have taken place in our lives and our civilization, at least during the last fifty or sixty years, if we are to have a real understanding of where we are now and where we are likely to go from here.

It is necessary for us to become, as James Harvey Robinson called it, "historically minded", and to view the present in the light of the past. Only with such a view can we really gain any conception of what our future is going to be. We must survey, not only the medicine of sixty or seventy years ago, but life as it was then and as it is becoming today, to understand why we have various economic and social and similar problems which greatly affect the medical profession.

Consider the average citizen of 1890. He got up early in the morning, in fact, he got up when it was still dark, because he had a long working day ahead of him and he had to get up early in order to get in the work which was to be done. When he came down to breakfast in the morning, he had a choice of oatmeal, whole wheat and farina. Today, we go down to breakfast and we have a choice of two hundred and thirty-seven different cereals. Still they are oatmeal, whole wheat and farina! But the wheat is shredded, the farina irradiated and the oats shot out of a cannon!

After getting his breakfast in the good old days, our man would go down to work, on foot, horseback or bicycle, or perhaps by street car. When he arrived in the shop, the work would be done with his hands, and there was plenty of work in those days for all men to do. Today, one machine with the assistance of two men who pull the levers, will do the work that required sixty men in 1890.

If our man happened to go to an office in 1890 he arrived on foot, horseback or bicycle, or perhaps by street car, and sat himself down at a desk. Pretty soon, would come his secretary, a languid damsel, tall, wearing a long, woolen skirt, her face lightly besprinkled with rice powder. Maybe she would aid him in opening five or six letters or in getting off the correspondence in longhand.

Nowadays the procedure is changed. The coiffures which used to be piled on the heads of the fair damsels have given way to bobbed hair which came into general fashion in 1915. The upkeep on two bobbed heads, including the permanent waving, cutting and setting in a family with a mother and grown daughter invariably equals more than the family medical bill for any given year.

The rice powder of 1890 has given way to the modern cosmetics. Back in 1900, the American women spent on cosmetics and perfumes \$40,000,000 a year, now, they spend \$2,000,000,000 for cosmetics and perfumes annually.

\*Read at the Annual Meeting of the New Hampshire Medical Society at Manchester May 27 1936

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oratory technicians. It also includes anywhere from 200,000 to 300,000 social service workers, who see the patients before they get to the hospitals, as well as in the hospitals and after they go home. Here is a tremendous personnel who also have a great deal to say about how medicine shall be practiced.

Part of the responsibility for this is undoubtedly due to the advances the doctors themselves have made. All of us recognize that due to the advancement of modern hygiene, the provisions for pure milk and water, as well as the proper disposal of sewage, we have greatly lowered infant mortality. We used to have 275 out of 1,000 babies die before they were one year old. We used to have very high figures for eclampsia and all the complications of obstetrics. The surgeon way back in 1875 got along without anesthesia, without asepsis in the vast majority of cases, but with a terrific mortality rate. There were few portions, indeed, of the body which the surgeon could invade. In a few of the big cities of the United States, competent surgeons were available, who couldn't do much of anything beyond an amputation. Just think how all that has changed. Samuel Meltzer was right when he said that the human body was equipped with great factors of safety. Great portions of the human organism are eliminated, and still there is recovery. We have two kidneys, normally, but we have found that we can get along with one. Perhaps we can get along entirely without the spleen, many people do. We can eliminate ten to twelve feet of intestines. We can do the polya operations and take off one-half or two-thirds of the stomach and get along fairly well. At the Johns Hopkins Hospital recently, one-half the cerebrum was removed from a woman, and it was found that she could think thereafter as well as any ordinary woman could!

These are tremendous accomplishments, and mean much for human happiness and human welfare. But, as they have come along, we have found it necessary to increase the complexity of medical care and to develop medical specialization. Thirty to forty per cent of the doctors today are engaged in specialties and there are twenty-six or more specialties within the practice of medicine itself. These specialists are divided and subdivided, and for each small group, they also get a special society.

In addition we have lengthened the medical courses. Back in 1875, the medical course consisted of two years. The doctors in those days learned medicine at the bedside. With more and more that there was to be learned about the new instruments and the methods of application, we found it was necessary to have assistants help the doctors in applying the instruments. Then the hospital came in as a central place in which all sorts of apparatus could be

used. Nursing came in with Florence Nightingale. In those days, we graduated from the medical schools 4,200 doctors, and from the nurses' training schools there were 300 nurses who were graduated annually. Today, we have in the United States 7,000 hospitals with more than 3,000 nurses' training schools. In 1905 we had 176 medical colleges, most of which were no good. In 1906, we graduated 6,500 doctors and from then on, we began getting rid of the poorer colleges. Today we have some 77 class A medical colleges in the United States, and we have cut down the number of graduates from 6,500 to 4,200. But, the nurses' training schools are turning them out at the rate of 22,500 nurses every year. Forty-two hundred doctors cannot marry 22,500 nurses! These matters give us great concern. There is no economist who is going to be able to work them out. There is a problem for the future.

We have the medical schools and the doctors and the nurses and the hospitals, and we have in the hospitals, due to the tremendous advancement of medical science and due to the removal of the patient from the home to the hospital for his medical care, a great problem created in many large communities—a problem that has not as yet been solved. How may the patient, whose family budget is split up into a great many items which he feels he must have because of the pressure exerted by modern advertising, be made to realize that medical and dental care are just as essential to his happiness as food, fuel, clothing and shelter, which are the real essentials of human happiness?

We must make sure that people have the essentials. That means largely, the abolition of a good deal of the prevailing poverty. We must provide them with medical and dental care. But the people want to spend \$12,000,000,000 a year for motor cars and used cars and automotive parts as well as gasoline. They want to spend \$4,000,000,000 a year on tobacco. Just think of that! In 1915 we used in the United States 7,000,000,000 cigars a year and 10,000,000,000 cigarettes. In 1919 it occurred to an advertising agent to put a picture of a singer from the Metropolitan Opera Company on a billboard and it showed her smoking a cigarette. With that, the insidious campaign to get women smoking started. Today instead of using 7,000,000,000 cigars, we use 6,000,000,000 cigars instead of using 10,000,000,000 cigarettes, we use 135,000,000,000 cigarettes. The vast majority of this increase in cigarette smoking represents the effects of cigarette advertising especially to women. The cigar consumption has not dropped appreciably. And the rise in population has only been a matter of 20,000,000 additional people.

In 1925, we used fifteen pounds of sugar per

a roadhouse, or a night club and dance around awhile, until two o'clock or so in the morning. Then they come home and wonder what time the children are going to get in.

All of the differences of which I speak are reflections that the home, the center of American life, has practically disappeared. The home, today, is a place in front of a garage, it has no real function in the American life of today. This has made a great difference, particularly in relationship to medical care. In 1890 to 1900, if a child was sick or even when it was born the function took place within the sanctity of the home.

In those days, mothers spent their time in the home. But women have come out of the home, they belong to all sorts of women's auxiliaries and parent-teachers' associations and similar organizations. We have from three to five times as many women, proportionately, in industry, earning a living. In addition practically all of the women not in industry have become independent in affairs outside of the home.

In the larger cities, the home has almost wholly disappeared as far as the rooms in the home are concerned. There used to be five rooms to a family in New York City, then it moved down to four rooms in 1920, in 1932, it came down to three rooms to a family. Now, while you may be able to play a little bridge in three rooms there are certain medical functions that are impossible to deal with in a three room apartment such as obstetrics, chronic inflammatory rheumatism and ozena. More and more, diseases have moved out of the home and into the hospital for their care.

It is not only the crowding in the home which has brought about the necessity of the hospital becoming the center of American medical affairs. The advancement of medical science is chiefly concerned in this change of medical practice.

You heard Dr. Kittiedge tell you this evening what medical practice was like in 1890. You know what the old doctor of 1890 was like. He practiced with the five senses and with a good deal of common or horse sense. Sometimes he had a fever thermometer with which he took the temperatures. The thermometer of 1875 was a long piece of glass, ten inches long and almost as thick. The doctor put it under the patient's arm, as there was no other place to put it and have the patient comfortable. Then he would wait for five minutes to get the result. Then he would look with his eyes to see what he could see. He would ask the patient to stick out his tongue. Tongues were quiet in 1890, and they acquired a thick coating once in a while which meant a good deal to a doctor in those days. Nowadays, the tongue is so rapid in motion that it never gets a chance to get a good coating.

If the doctor in the days of 1890 wanted to look down his patient's throat, the mother used to come and stand over his shoulder with an oil lamp. The physician looked down the sick person's throat as far as he could see, which wasn't very far.

Nowadays, with the development of the electrically lighted instruments, it becomes possible for the doctor to see into every entrance and exit in the human body. He has a "scope" for every aperture and if it so happens that there is none, he can make one. He has a bronchoscope, an esophagoscope, a cystoscope, proctoscope, and all of these various "scopes". This represents a great advancement in science, it represents an extension of the power of vision. We had, at first, the use of the microscope, which was just magnification. But here we have a direct extension of the power of vision into the body, enabling the physician to see and measure things which formerly he used to guess at.

In 1900, there was developed the Roentgen ray. We were able, first of all, to see the bones within the lining of the body. Then we made visible the cavities of the lung by the use of lipiodol. Then by the use of barium and bismuth preparations, the doctor was able to outline the stomach and the gastrointestinal tract. Then came the visualization of the gallbladder, the liver and the spleen. The doctor can look, now, and see a great many things about which formerly he had to guess. This means a great deal for the safety of the patient and a tremendous improvement in diagnosis. We can transform the functions of the human body into records that are visible and measurable. That means science,—when we can actually measure a function in terms of mathematics. We have the electrocardiograph, which causes the heart to write down its ability to function under various conditions. We have the basal metabolic apparatus, the Binet Simon and similar tests. The doctor is able to test and measure the heart and lungs, the gastrointestinal tract. He can also measure the function of the brain, but that is more disappointing.

I agree with Dr. Kittiedge that it is far better to apply an actual knowledge of the history of the disease, and to use the five senses, of course, to the utmost in making a diagnosis, than it is to become too reliant on the various machines and scientific material we have at hand these days.

Back in the old days, an occasional practical nurse helped out the doctor. Nowadays, in addition to the 150,000 doctors who are licensed, 130,000 of whom are in actual practice, we have a total of 1,500,000 additional people who give their time to the care of the sick, that includes a total of about 100,000 practical nurses, 150,000 graduate nurses, 60,000 pharmacists, cooks, druggists, x-ray technicians and chemical lab-

of defectives, and then we wonder why it is that we have to pay for the care of the defectives

I cite all of this for just one purpose I want to show you that social legislation is, unfortunately, not like medical discovery Scientific discovery is associated with cultural advancement It requires ten to twenty years for a new discovery in medicine to be filtered down from the top so that it becomes the property of the average physician, and so that it may be applied generally in his care of the sick It requires gradual instruction, publication of a great number of medical periodicals, and other methods

But social legislation is entirely different It attempts to anticipate by twenty years what medicine is able to do All that a first-class social legislator needs is one idea, and he can build a

superstructure of it, then he can associate it with taxation beyond the dreams of what a medical scientist could ever hope to accomplish

There is just one thing that medicine has asked of the government, legislators and the social scientists Let medical progress, from the social, scientific point of view come by evolution, rather than by revolution Permit the doctors to work out the proper plans, in association with each other for giving to all of the people the immense benefits of medical science, to which I have referred

With the 3 000 years of medical tradition of service to the sick and the poor and the ailing, the public may well have confidence in the medical profession

## PUBLIC RELATIONS OF THE MEDICAL PROFESSION\*

BY MORRIS FISHBEIN, M D

### *Members of the New Hampshire Medical Society and Guests*

THE public relations of the medical profession are naturally far different today from those of previous centuries Then there were no public health departments, preventive medicine was not practiced by the individual physician, there were no legislative enactments controlling the health of the vast majority of the people, even the medical profession itself was not concerned with the education of the public with relation to the fundamental of hygiene and health

We have just listened to an interesting discussion of the relationship of the physician to the prevention and control of eclampsia Contrast the obstetrics of fifty years ago and the obstetrics of today It will reveal how the public commerce and industry generally and medicine as well, have entered into the control of an ordinary case of obstetrics

In 1890 if a woman was going to contribute to the population the matter was kept a secret even from her husband until well along in the course of the event Certainly the doctor was not informed until the changing contours made necessary an explanation Then the doctor would be informed but he would do nothing about it He would merely make a mental note of it Perhaps when biology culminated he would be called to the sanctity of the home He would arrive posthaste by foot, horseback or bier, and in a short time with the aid of the mother the aunt a livery stable keeper or

somebody else a new baby would appear in the community The results were sometimes unfortunate but there are still, as we have heard, unfortunate results

Nowadays, women belong to women's clubs and study groups and adult education societies, and they are eugenically minded They consult the doctor even before they have any idea of contributing to the population When the doctor tells them they are fit to entertain that idea, they proceed Very promptly, now, the doctor is informed

All of you know about the State and social relationships that are involved in this condition Nowadays the doctor may immediately inform the City Health Department, the County Health Department, the State Health Department, the American Association for Child Care, the Bureau of Labor in Washington D C the American Social Hygiene Association and many other similar bodies who are much interested in the prospective birth Just as soon as all these people hear about it, they begin sending pamphlets When the postman arrives at the woman's home, he is so loaded down with books that he can scarcely carry them What the postman knows everybody knows! What was formerly a secret is now widespread knowledge Then, if the people happen to be anybody in public life, Walter Winchell finds it out and announces it on the radio

In addition we have preventive methods The woman comes at once to the doctor's office where she is measured hither and thither, fore and aft, and photographs are taken of her in various postures including x-ray pictures Everything she can secrete or excrete is submitted to chemical and physical manipulations This is continued for a considerable time, once

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person a year. In 1935, we used one hundred pounds of sugar per person a year. Our consumption of sugar, sweets, ice cream and confectionery goods costs us \$2,500,000,000 every year.

Because we have all sorts of machines to do the household drudgery, reducing the mechanical labor to nothing, and because we have greatly increased our consumption of sweets, women are getting big in all the places where they would be small. Then they buy Jad Salts and Crazy Crystals and all that sort of thing to get rid of the unnecessary foods that they pour into their bodies. It is an irrational form of civilization, yet it is the civilization we have.

We spend \$3,000,000,000 a year on movies, \$2,000,000,000 on radios and musical instruments, including saxophones, \$2,500,000,000 on confections and sweets, \$4,000,000,000 on tobacco. What a contrast to our entire medical bill of only \$3,800,000,000! That was the bill of 1929. The bill of this year is much less.

Approximately \$750,000,000 goes to the doctors, \$700,000,000 for hospitals and nurses, \$375,000,000 for patent medicines, \$125,000,000 for chiropractors, osteopaths and thirty seven different faith healing cults.

Now, if we could take the \$375,000,000 spent on patent medicines and the \$125,000,000 spent on the cultists, we have over \$500,000,000 right there that we could save from the purse of the American public and apply it to legitimate medical care. Do we have a rational civilization?

Of course, we spend, out of the annual budget, a total of \$100,000,000 a year on preventive medicine. But, all of you can understand that that is not adequate for the needs of the American people. All of us welcome the addition of \$10,000,000 a year brought about through the recent social security legislation and distributed in the individual states.

Recently, Josephine Herbst, in her book, "If I Have Four Apples", pointed out the one thing that the average American housewife needs to learn—mathematics. It is just a simple problem. If I have four apples, and give one to John and one to Susie, how many apples will I have left? The vast majority of the American women have never learned arithmetic in the schools, because they have not learned how to take the money in the family and buy the essentials and then find any money for the luxuries. They have learned subtraction, but they have never learned long division.

The average wife sits at home and is besieged by the salesmen of the electric refrigerators on the installment plan, as well as vacuum cleaners, radios, and motor cars for so much down and so much a month until they catch up with you.

They are now trying to figure out new ways

of paying for medical care. I should like to point out three ways to pay for anything, if you are really serious about paying for it.

1 Pay cash. This has become largely a lost art in the United States because of our high pressure system of salesmanship.

2 Pay by the installment plan. After you get the goods, you pay as much as you can and as often as you can, with the hope of eventually owning it. And you know you often see cartoons depicting this method of payment, "Three more payments and the baby is ours!"

3 By a prepayment system. You pay so much in advance each month with the expectancy that sooner or later you are going to have to need the item for which you are paying.

We have, unfortunately, educated the vast majority of our people into the idea that they are never going to be sick. We have freed them from the fear of disease. They don't go around nowadays, afraid of dying suddenly from scarlet fever, typhoid fever, or any of the conditions that used to carry them off. Life expectancy, instead of being forty-five years of age is now fifty-nine years of age. They do not anticipate illness. We really need a new campaign which will show them that they must be sick, sooner or later, even if it is only previous to death. When they are sick, they will have to have the doctor. He is just as necessary, then, as the food, clothing and shelter, which are necessary to human happiness.

As a result of agitation of the social scientists, we now have social security legislation. There would have been no necessity for that, had it not been for the accomplishments of the medical profession since 1890. In 1900, when there were still homes, and when people stayed at home occasionally, there was a place to take care of old people. Life expectancy at that time was forty-five. Now, we have moved life expectancy up to sixty years of age, without providing incomes or homes for the older people, when they get seventy, eighty and ninety years of age. That is the reason we have the problem of old age pensions!

They used to get rid of the blind and the hard of hearing, and the crippled and the mentally defective. We did not know how to take care of them. We used to lose the babies because of malnutrition, but now we save them by new systems of nutrition. We give the hard of hearing all the new hearing aids. We take the blind, do surgical operations on them, provide them with glasses, enable the blind to see. We permit the hard of hearing to learn lip reading. The cripples used to die, but now we rehabilitate them by under-water gymnastics, by supports and reconstructive and rehabilitation operations. We accumulate tremendous numbers



are approximately 10,000,000 with syphilis at any one time. Therefore we are certainly not controlling the disease.

It has been suggested that as a means of controlling syphilis, we have universal reporting with adequate penalty for failure to report and yet, here we run against the inalienable right of the individual to die by any route by which he desires to die.

We know there are methods of control by the administration of suitable prophylactic methods after exposure, which may possibly be effective if we could make an early diagnosis and give exceedingly prompt and adequate treatment.

But thus far, these are matters of debate, and there has been no definite decision as to how syphilis is to be brought under control. There will be none until we consider it a community problem rather than an individual one, yet it is not likely that either the medical profession or the public is ready to have that particular disease made a matter for state or community control.

We all know that there was a time when medicine was held as mysterious and understood only by doctors. The doctors did not talk to the patients or the public generally about the methods of prevention. We know, today, the changing attitude toward the necessity of suitable education of the public, in order to get public cooperation in relationship to the control of disease.

We have today, in practically every newspaper of the United States, a great amount of public health education constantly carried on, not only through the news columns, but also through specific health columns. These health columns are occasionally written by physicians who spend their full time in public health work, and in many instances by county or state medical societies or by county and state health departments. All these are useful within certain limitations in informing the public concerning the early symptoms of disease, and in that way, aiding early diagnosis and adequate treatment.

Moreover, the Bureau of Health and Public Instruction of the American Medical Association recognizes the duty of informing the public, and puts on a radio program each week reaching millions of people, giving them in dramatic form the methods used by the medical profession so that they may know what is available through scientific medicine and in that way bringing the patients earlier in their conditions to the medical profession so that they may get adequate care.

In New Hampshire here, you have the State Medical Society. You have a Speakers' Bureau so that you can send speakers to the Rotary, the Moose, Lions and to all the clubs so that

all their families may find out what is going on in medicine and keep abreast of the times.

Through our Bureau of Health and Public Instruction, we made a liaison with the Parent Teachers' Association, the National Educational Association and various groups of similar type. Altogether, there is no phase of human life in the United States today which medicine does not approach at some point and in which the physician has not a tremendous influence.

I should like to mention particularly the relationship to education, because it is now ten years since the National Education Association put health as the most important point that can be covered in the curriculum. Health is quite definitely integrated in the curriculum as a whole. Instead of teaching the children only reading, writing and arithmetic, they find out, in addition, certain facts about getting a right amount of milk daily, they find out about vitamins, the importance of fats and the mineral salts. They also find out about the early symptoms of infectious diseases, diphtheria, smallpox and the like. In that way, health is quite definitely in the curriculum.

Although children study about the downfall of Rome, Caesar and the great generals, they also find that malaria ravaged Rome at one time, being carried by the mosquito. They find that the mosquito was as important in the downfall of Rome as the habits of lasciviousness, the latter being more interesting but not so important. Here again, we have an integration of medicine and the public knowledge, which is a matter of greatest importance for the public health and one of which we should take due account.

As most of you know previous to 1900, there was little interest in the United States in the question of pure foods and drugs and the control of patent medicines. Upton Sinclair wrote "The Jungle" and Samuel Hopkins Adams wrote "The Great American Fraud" in the *Ladies' Home Journal*. This was soon reflected in the *Journal of the American Medical Association*. Then under the first Roosevelt, we developed a law having to do with the control of foods and drugs. This is a matter of great interest to the medical profession because we have found it important to try to control quackery of all kinds as well as miscellaneous adulterations and misbranding. The law which was passed in 1904 seems wholly inadequate today. The reason is, of course that since 1904, we have had a tremendous increase in advertising as an industry. Today the vast majority of people who buy things buy them not from what they see on the package or the label but from urging by advertising on billboards, industrial cards, in the newspapers and magazines and over the radio. What they read

a week and perhaps later three times a week. Everything she eats is weighed, everything she drinks is measured, and it comes out scientifically. It is measured when it comes out, also.

As the time approaches when the child is to come into the world, if the woman happens to live in a large city, she goes to a hospital, where she is met by the receiving clerk, who sends her to the recording clerk, and perhaps the social service worker or the visiting nurse has previously been to her home and determined the factors necessary. Then everything about her past and present is written down, after which she goes in the elevator to her room, where she is received, not only by the obstetrician, but by the nurse, the dietitian, the radio technician who fixes up the radio in her room, and the hospital librarian who brings her books and magazines. Then there are young men in white coats around to greet her, they sit on the side of her bed and entertain her. They put her on little carts and see that she gets to the electrocardiograph room and the basal metabolism room. Many people have entered into what was formerly a process involving the husband, the wife and the doctor.

There is more to medical relationships than there used to be. When Percival developed the principles of ethics which today guide the American Medical Association, except with such modifications as have been made by our House of Delegates, and gave them to the British Medical Association, in 1803, no section was concerned with the relationships of the doctor to the public, they were concerned only with the relationship of the doctors to each other, the relationship of the doctors to the pharmaceutical profession, and, to some extent, the rights of the patient to be protected in matters of confidence. But the relationships of the doctor to public health departments, which had not yet been organized, or to the public as a whole, were hardly given a thought.

These principles of ethics, developed by Percival and put out in 1803, after he had consulted with numerous people of great importance both in the practice of medicine and outside the practice of medicine, were adopted almost in toto by the American Medical Association in 1838, after its foundation in 1837, at which time Isaac Hays of Philadelphia was appointed Chairman of a Committee to provide the American Medical Association with some principles of ethics.

Those principles went almost without modification until the turn of the present century, or after the beginning of the 1900's, then we began to find that increasingly, the relationships of physicians to health departments, legislatures to each other and to the question of public edu-

cation were going to demand new principles. If you will read carefully your principles of ethics today, and study those which concern the relationship to the public, you will find that we have tried to take account, from time to time, of the changes that have occurred.

Let us take, for example, just the question of public health departments, and relationships of the doctors to preventive medicine.

Perhaps the first Public Health Council was called in Venice around 1600, at a time when they were greatly concerned with the plague and not making very much progress against it. Later as we developed vaccination against smallpox and specific inoculations against various diseases, we began to have legislation demanding that physicians become more interested. We had laws passed concerning quarantine and isolation, and we now know how to prevent disease by using simple measures.

As time went on, and we began getting more and more measures for the prevention of disease that might apply to the individual, we began having the conflict that occurs between the prevention of disease affecting the individual and that concerning the community. Soon we began having a conflict of interests among the medical men, the health departments, and the people as a whole.

We are beginning to realize today that the duty of prevention of disease for the individual is the duty of the individual physician. The duty of prevention of disease, as a whole must be the duty of state health departments, for example, the proper disposal of sewage, control of industrial plants and food and water supply may well be allocated to health departments as their legitimate duties. The taking over of inoculations in times of epidemics might well be allocated to health departments, as well as the prevention of diphtheria, at times, and smallpox by vaccination. But when smallpox does not threaten in epidemic form, prevention is a matter between the individual doctor and the individual patient, we see here the necessity for an allocation in the field of preventive medicine of what belongs to the doctor and what belongs to the state.

In an article published two years ago, Thomas Parran pointed out that in the State of New York at the present time, 25 per cent of the medical practice is quite definitely under the control of the State.

If you will analyze the situation as it exists there, you will find that he did not exaggerate a particle. We have the question of control of the venereal disease, syphilis. I think we all recognize that the campaign against syphilis has not been a successful enterprise. It is estimated that out of the 120,000,000 Americans, there

## PERSONALS

Dr Albert Philip LaFrance of Laconia was married to Miss Dorothy Marie LaFarr on June 27 1936 Dr and Mrs LaFrance sailed on the SS California for a two months honeymoon trip in England

Miss Dorothy Alden and Dr Raymond J Turley of Veredith were married at the Congregational Church in that town on Tuesday September 15

Dr Walter H Lacey of Keene gave a talk on Some of the Fundamentals of First Aid Treatment Particularly as Regards Accident Cases before the members of the Norris Brotherhood of Grace Methodist Church on September 8

Dr Merrill Moofe of Boston spoke on Some Historical Aspects of Neurosyphilis on the evening of September 8 before the New Hampshire Medical History Club of the New Hampshire State Hospital

Dr Joseph E Larochelle of Manchester was selected as a member of the Administration Board of the Association des Medecins de Langue Française de l'Amerique du Nord (North American French Speaking Doctors' Association) which was held at Montreal recently

Dr Ezra A Jones of Manchester was a member of the General Committee arranging for the third annual gathering of physicians from Maine New Hampshire Vermont Massachusetts and Canada at the Balsams Dixville Notch over Labor Day week-end Dr L G Dearborn of Manchester was on the banquet Committee

## HOSPITALS

The recent benefit performance of the Yale Puppetters at Peckett's Playhouse Sugar Hill, netted the Woman's Board of the Littleton Hospital the sum of \$1 000 As a result of this, the hospital is to have a fully equipped laboratory and new x-ray apparatus in charge of a full time technician.

Announcement was made just before the start of the annual Hospital Week in North Conway August 15 22, of a trust fund of \$50 000 from the estate of Winthrop M Pitman who died in Boston sixteen years ago Mr Pitman was born in Bartlett and bequeathed this sum to the hospital with the proviso that it would be held in trust and the income would go to Mrs Pitman during her lifetime Mrs Pitman died the latter part of July

The new Mitchell Memorial Hospital at Brentwood will be ready for patients on or about November 1 The building will have 35 beds

A meeting of campaign workers of the Mary Hitchcock Memorial Hospital was held in College Hall October 1 for the purpose of launching the drive for \$300 000 to build four new hospital units Congressman Charles W Tobey and Rt. Rev John T Dallas spoke on the program at which the Dartmouth College Band and Glee Club entertained with Dartmouth songs Edgar H Hunter of Hanover Chairman presided

The Portsmouth Hospital Guild held its first meeting this season on October 2 Twenty two members were present and much work was accomplished.

## CANCER

Deaths from cancer increased in New Hampshire last year, according to the July issue of *Health*, the monthly bulletin of the State Board of Health The total number of deaths for 1935 was 786, an increase of 31 over 1934

## CLINICS

Tuberculosis clinics were held in Keene, Marlboro and Rindge during October The clinics were in charge of Mrs Mildred Aiken county nurse

Twenty-eight babies were examined at the Clinic in Elliot Community Hospital September 25 Dr Walter F Taylor was examining physician The clinic was under the supervision of Miss Ann Savage, Superintendent of Nurses for the Keene District Nurse Association

## MATTERS OF INTEREST TO NURSES

Hospital Superintendents who attended the American Hospital Association meeting in Cleveland Ohio recently were Miss Lillian Williams Laconia Miss Mabel Parsons Franklin Miss Hazel Fuller Manchester Miss Louise Thompson Keene Miss Mary Whittaker Concord, and Mrs Alice Cleland Concord

The quarterly meeting of the Keene District Nursing Association was held October 5 Miss Ann Savage Superintendent of Nurses gave a report of the visits during the last quarter as follows Total number of visits 1 144 Of these 495 were medical 305 surgical 150 obstetrical 130 newly born 64 welfare

The October meeting of the Board members of the Portsmouth District Nursing Association was held on October 7 Following this a special meeting was held at which time it was decided to hold the annual meeting in January instead of July

## RECENT DEATHS

**DOUGHERTY**—THOMAS J DOUGHERTY M.D son of William and Katherine Gregg Dougherty was born in the town of Schaghticoke N Y on October 23 1868 He attended the public schools of that town and later in Troy N Y He received his medical education at the Baltimore Medical College which later merged with the University of Maryland and was graduated in 1894 After serving as an intern in a Pennsylvania hospital he went to Somersworth N H where he practiced until the time of his death on July 4 1936

In 1897 he married Miss Alfreda McLean of Poughkeepsie N Y

Dr Dougherty was a member of the American

in the newspapers and hear over the radio is by far the greatest educational influence in the United States, far exceeding the influence of the schools, lectures or any other type of education given to the public. Thus, as a result of the growth of modern advertising, with a complete lack of control over what the advertiser may say, we have a condition in the field of food and drugs and patent medicines far worse than the condition existing in 1904, when the first Food and Drug law passed.

Moreover, we know today that the control of public opinion by the modern method of propaganda is the way we get legislation and keep it after we get it. We find ourselves in what doctors are prone to call a "vicious circle." We find a condition which ought to be cured, but which we cannot cure because the things we would use to cure it cannot be reached by us, because we do not have the system for using the means required. In other words, the very people who ought to be supporting legislation for an ideal situation, with relation to food and drugs, such as radio and newspapers find it against their own interests to support adequate legislation, because that would cut down greatly on their incomes.

This week, there came out of Congress, after two or three years of vicissitudes, some legislation which seemed at first exceedingly promising. Yet the bill which is now reported out of the house with recommendations for passage has undergone a form of plastic surgery, which legislation frequently undergoes in these United States. Instead of getting the legislation we should have to take care of the situation, we have a sort of monstrosity which is not going to be good for anybody. Even its progenitors will not be willing to claim it.

Such incidents indicate the great importance of having the medical profession strictly aware of what is going on in the field of legislation, and in having, in every medical society, committees on public relations, and committees on all the special affairs which concern the medical profession and which concern equally the health of the public.

Beginning eight to ten years ago there was and persists yet to some extent, a definite trend in the United States toward the socialization of medicine. You know the efforts made by the Committee on the Costs of Medical Care, and by the Rosenwald Foundation, to endeavor by means of propaganda and other techniques to cause the vast majority of the people of the United States to get the idea that their only salvation lay in socialized medicine. It is no secret that that is the platform of the Socialist party, perhaps not with the hope of adopting it this year, but they are looking to the future. There is a plank in

their party platform stating that medicine should, like education, be socialized and put on the same plane as education for the vast majority of the people.

In eight or ten state educational associations before which I have spoken, the leaders of education are quite averse to this sort of procedure. They are hoping that the time will come when education can be less socialized, in order that it may make progress instead of retrogressing. In other words, they, themselves, recognize what has happened to education through certain forms of socialization that have taken place, and they are actually looking forward to a time when education may be taken out of the doldrums and begin to do what it really can do when given the proper control.

We do not want to see medicine put on that plane. We have bent every effort with our membership in the United States to averting such a disaster. It has been rather successfully averted up to now. We feel certain that compulsory sickness insurance, either under a system of taxation or otherwise, would have been a part of social security, had not organized medicine made its influence felt where it was needed.

At the meeting of the American Medical Association held in Kansas City, the candidate for the Republican nomination for President stated quite definitely his opposition to the regimentation of medicine, and also stated quite definitely his belief in the personal responsibility of the doctor to the patient and of the patient to the doctor. No longer ago than yesterday, President Roosevelt, in a message sent to the American Conference on Social Welfare, meeting in Kansas City, emphasized to the social welfare workers (the body chiefly concerned in the attempt to break down our structure) the importance of recommending that the human being must be considered, not as an individual to be counted up in statistics, but as a person who requires the kind of human care that medicine has always given to ailing beings in the past. If we want to continue to maintain our interests in public relationships, we will continue to have the influence which makes it possible for the doctors to say how medicine shall be practiced.

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## MISCELLANY

### ANNUAL MEETING

The next annual meeting of the New Hampshire Medical Society will be held in Manchester New Hampshire on Tuesday and Wednesday May 18 and 19 1937.

## MEDICAL PROGRESS

## PROGRESS IN DISEASES OF THE COLON AND RECTUM

BY E. PARKER HAYDEN, M.D.<sup>1</sup>

## LOCAL ANESTHETICS

ONE of the interesting advances in the treatment of diseases of the anus and lower rectum consists in the use of certain oil soluble local anesthetics which produce a satisfactory anesthesia during the operation and a prolonged period of anesthesia afterward. Various reports on the use of these different agents have appeared in the journals both here and abroad among which the several articles abstracted below are typical.

From the Rectal Clinic of the Beth Israel Hospital in Boston, Steinberg<sup>1</sup> reports his experience with the use of three local anesthetic agents in the treatment of anal fissure. Two of these he has discarded in favor of the third solution which has proved much better in respect to degree of anesthesia.

Benacol, para amino benzyl-benzoate and pheno-methylol, equal parts in sweet almond oil, was used by Yeomans, Gorsch and Mathesheimer in 1929. The same year Gabriel described a solution, which he called A B A, composed of nupercaine 3 per cent, benzyl alcohol 5 per cent, and ether 10 per cent in sterile oil. Both of these preparations produce in some cases considerable pain during injection and for a while afterward.

Definitely superior to either of these is a preparation of nupercaine base 5 per cent, benzyl alcohol 10 per cent, and phenol 1 per cent in sterile oil of sweet almond. Steinberg reports the use of this in thirty cases of anal fissure. There was some pain for one to three hours afterward in eight cases, whereas the remaining twenty-two had no pain. The anesthesia comes on quickly, permitting excision of a sentinel pile if indicated and lasts seven to ten days. The solution is injected beneath the fissure and into the sphincter also using a total of about five cubic centimeters.

Simmons<sup>2</sup> gives a brief review of the requirements of a good local anesthetic and a discussion of the ones in widest use is given, together with the conclusion that the following solution first suggested by Gabriel, is most efficient: nupercaine 5 per cent, phenol 1 per cent, benzyl alcohol 10 per cent in oil of sweet almonds. Simmons reports the use of this anesthetic agent alone in thirty hemorrhoidectomies with prolonged anesthesia and good relaxation of the

sphincter in each case. Procaine is used in the skin, and the oil solution is then injected deeply into the region of the sphincter through an anterior and a posterior puncture, using three to five cubic centimeters of solution in each area. Care should be taken not to pool the solution in any one area lest an abscess result. Anesthesia lasts from seven to ten days.

Diothane or piperidinopropanediol di-phenylurethane hydrochloride, in a 5 per cent or 1 per cent aqueous solution, was used by Smith<sup>3</sup> as a local anesthetic of long duration in a total of seventy-three cases with generally good results. Forty-two of the cases comprised the author's own series, and the others are reported by courtesy of two colleagues. The drug is injected in the perianal tissues, using a minimum of five cubic centimeters. It may be used alone, for office operations, or injected at the end of an operation under other types of anesthesia in order to produce lasting anesthesia. The duration of anesthesia varied from twenty to seventy-two hours. This anesthetic, being in aqueous solution, would not be expected to give so lasting an effect as one of the oil soluble anesthetics.

Morgan<sup>4</sup> has decided, after a process of elimination of various other local anesthetics, that the following solution is most satisfactory for use in and around the anus: procaine base 15 per cent, butyl-para-aminobenzoate 6 per cent, benzyl alcohol 5 per cent in sterile almond oil. This gives a certain and prolonged anesthesia up to seven to twenty-eight days, painless induction if injected slowly, no severe after-pain, is comparatively nontoxic and gives good muscle relaxation. It may be used in amounts up to twenty to thirty cubic centimeters.

## HEMORRHOIDS

The treatment of internal hemorrhoids by the injection of a mildly irritating chemical solution has continued to hold favor with a great many surgeons. It may be stated in general that this method which is applicable only to the treatment of internal hemorrhoids will eliminate bleeding and protrusion of the hemorrhoids after one or more treatments and if continued for a longer period, will produce a correspondingly more permanent relief from symptoms.

Baleh<sup>5</sup> has made a study based on an analysis of three hundred and fifty-nine cases of internal hemorrhoids treated by injection in the Rectal Clinic of the Massachusetts General Hospital. He emphasizes the fact that only internal hem-

<sup>1</sup>Hayden E. Parker—Chief of the Rectal Clinic, Massachusetts General Hospital. For record and address of author see This Week in Medicine, page 944.

Medical Association, the New Hampshire Medical and the Strafford County Medical Societies. Fraternally he was a member of the Catholic Order of Foresters, Ancient Order of Hibernians and the Dover Lodge of Elks

He is survived by his widow two sisters Mrs Frances Bragg and Miss Katherine Dougherty and a brother, John Dougherty, of Poughkeepsie, N Y

**DIXON**—JAMES H DIXON, M.D., died at the Portsmouth Hospital on September 20, 1936 following a long illness. He had practiced in Portsmouth for nearly forty years

Dr Dixon was fifty nine years of age and a native of Portsmouth. He was graduated from the Portsmouth High School, and the Bowdoin Medical School in 1898. After serving his internship he opened his office in Portsmouth. He served as city physician and also was chairman of the Board of Health during the influenza epidemic in 1918.

Dr Dixon was a member of Portsmouth Medical Society and a former member of the New Hampshire Medical Society.

He is survived by one sister, Mrs James F McGlinchey, of Portland, Me

**CROWELL**—The body of GEORGE M. CROWELL, M.D., was found in a field in Pembroke on August 12, 1936, after 200 men had searched for him when he had failed to return to his home after exercising his dog. Death was pronounced due to a heart attack.

Dr Crowell was 64 years of age and a native of Providence, Rhode Island. He graduated from Brown University in 1894, and Harvard Medical School, cum laude in 1899. He practiced in Providence R I, Canaan and Candia, N H, before going to Pembroke, where he practiced for nine years until his death.

Dr Crowell was a member of the Merrimack County and New Hampshire Medical Societies and the Manchester Medical Association. He was also a Mason and an Odd Fellow.

Dr Crowell is survived by his widow and one daughter Mrs A. Dayle Wallace of Omaha Neb, one grandchild, Sylvia Crowell Wallace and one brother Arthur F Crowell, of Ashland Mass.

**ROBINSON**—J FRANKLIN ROBINSON, M.D. the last surviving member of the original staff of the Elliot Hospital died at his home in Manchester N H on September 5, 1936 after an illness of several years.

Dr Robinson was born in Wenham Mass in 1863 but had been a resident of Manchester since he was 15 years of age. He received his medical degree from Harvard Medical School in 1886. After visiting some of the hospitals abroad he returned to Manchester to practice. He served as surgeon for the Boston & Maine Railroad for 35 years and was also surgeon for the Stark Mills for many years.

Recently he was awarded official recognition by the New Hampshire Medical Society at its annual meeting for his years of service as a leading physi-

cian in the State having practiced in Manchester for 50 years.

Dr Robinson was a member of the American Medical Association, New Hampshire Medical Society, Hillsborough County Medical Society, Manchester Medical Association and the New Hampshire Surgical Club. Fraternally he was a member of the Washington Lodge of Masons, Mt Horeb Chapter, Adoniram Council, Massachusetts Order of the Loyal Legion and the American Legion Sweeney Post.

Survivors include the widow, Mrs Grace Robinson, a sister Miss Annie Robinson, and several cousins.

**DELANEY**—EDWARD J DELANEY, aged 58 years, member of the Senior Medical Staff at the Margaret Pillsbury Hospital and a practicing physician in Concord, N H, for 32 years, died at the Hospital on October 21, 1936.

Dr Delaney was born in Nashua, N H, on April 13, 1878, son of Patrick and Katherine (Egan) Delaney. He attended St. Anselm's College, graduated from Dartmouth College and received his medical degree from Baltimore Medical College in 1903.

He was on the State Prison staff for 22 years and was a member of the St. Paul's School examining staff. During the World War he was commissioned as first lieutenant in the Medical Corps.

Dr Delaney was a member of the city, county and state medical societies. Fraternally he was a member of the Wonolancet Club, Concord Council, Knights of Columbus and the Concord Lodge of Elks.

A sister Mrs Frank Clancy, and a brother, Mark Delaney, both of Nashua survive him.

**DRESSER**—NORMAN B DRESSER, M.D., prominent Berlin, N H physician, was found dead from a heart attack on October 20, 1936.

Dr Dresser was born in Berlin 42 years ago, son of Mr and Mrs Loren Dresser. He was a graduate of Berlin High School and attended Dartmouth and Bowdoin Medical Schools. For 2 years he served the City of Berlin as health officer and for a number of years held the post of medical examiner and coroner.

Dr Dresser is survived by his widow Mrs Olive Lavalley Dresser, a daughter, Nancy, his parents of Quebec and two brothers Clarence J of Cleveland Ohio and Jacob W, of Brooklyn N Y.

**LEAVITT**—BIRON CHARLES LEAVITT, M.D., died at his home in Duxbury on August 18 after a long illness.

Born in Waterboro Maine September 24, 1858 the son of Benjamin and Ethelinda (Deering) Leavitt, he graduated from Dartmouth College in 1881 and from the Harvard Medical School in 1887. Following a period of study in Europe he practiced in Denver Colorado until 1905 when he removed to Duxbury. Here he followed his profession so far as his health would permit until his final illness.

His widow Alice Silsby (Appleton) Leavitt survives him.

colostomies showed an average rise of  $2^{\circ}$  F, but in one child the rise was  $8^{\circ}$  F. The presence of infection seemed to have no influence either in increasing or decreasing the penetration. In conclusion, the experiments seemed to show that there was a definite rise in temperature within the abdomen if the abdominal wall was not too thick, and prolonged application did not increase the degree of penetration.

Curry and Barger<sup>9</sup> carried out some interesting experiments on the powers of absorption and excretion of the distal segment of the left colon in man subjected to a loop, or double-barreled, colostomy. Such a distal loop can be thoroughly cleaned out, from stoma to anus, and substances introduced into it can be fully recovered for study. The complication of having fluid pass up into the ileum is eliminated. Methylene blue, atropine, glucose, and sucrose were used in separate studies. All of these were shown to be absorbed. Methylene blue and sucrose were excreted in the urine. Arsenic taken by mouth as neoarsphenamine, was excreted both in the urine and in the distal segment of colon. The distal segment of bowel did not excrete glucose, methylene blue, or sucrose taken orally. These observations are of value in helping to settle some uncertainty as to the powers of absorption of the left colon, and confirm the value of using the rectum as a means of getting water and sugar into the body circulation.

The use of electrosurgical coagulation in the anastomosis of hollow viscera is again brought up for consideration in an article by Wadhams and Carabba.<sup>10</sup> Previous experimental work on this subject was done by Ward, and also by Briggs and Whitaker, working independently but published at approximately the same time. The theory of this type of anastomosis is based on the fact that two loops of bowel wall properly coagulated, and then opposed to each other by sutures around the periphery, will establish an anastomosis in from thirty-six to forty-eight hours after operation. A line of coagulation is made along each loop, corresponding to what would be the line of incision in an open anastomosis. This is done by a series of punctures through the serosa into the muscularis, with just the proper degree of coagulation which by experience the authors find will destroy the mucosa also. A fifteen hundred milliampere current, continued to the point when the first blanching turns to a dirty gray color, is just right. After suture of the two loops together, with the lines of coagulation opposing each other, complete sealing of the periphery occurs before the coagulated area gives way and the stoma becomes patent. The method was successful experimentally in side to side anastomosis of the colon, anastomosis of duodenum to ascending colon, in gastroenterostomy, cholecyst-

gastrostomy, ureterocolostomy, and in cutting the spur in a Mikulicz procedure. The authors have never seen a secondary hemorrhage! Fifteen diversified anastomoses were carried out on dogs, and one on a human being, without mortality, leakage, infection, or hemorrhage.

#### ANAL FISTULA

A careful microscopic study by Tucker and Hellwig<sup>11</sup> based on over four hundred specimens of the anal region, including fifteen millimeter and thirty millimeter embryos, has shown definite tubular glands which terminate in the crypts of Morgagni. They are lined with stratified columnar epithelium which becomes cuboidal in the smaller branches. These glands coincide with the anal glands of the rabbit, dog, pig, and chicken, and probably developed at the same time, embryologically, as the prostate and para-urethral ducts. The infection which leads to perianal abscess and fistula undoubtedly starts as an infection in these glands.

Clusholm and Gauss<sup>12</sup> present an analysis of seventy-one cases of proved or probable anorectal tuberculosis and one hundred and six nontuberculous cases used as a control. The question of the relationship of tuberculosis to perianal abscess and fistula has been long disputed and there is a wide divergence of opinions on the matter. Of the one hundred and six cases with ischio-rectal abscess or fistula in patients clinically free from pulmonary tuberculosis, tubercle bacilli were not demonstrated in a single case by guinea-pig test or culture method, and histologic section showed giant cells in only two instances. On the other hand, in thirty-one cases of active pulmonary tuberculosis and eighteen cases of arrested pulmonary tuberculosis, similar material yielded the tubercle bacillus in 77 per cent and 55 per cent of the cases respectively. The authors emphasize that because the patient has pulmonary tuberculosis it does not necessarily follow that the rectal lesion is tuberculous. The authors are quite optimistic about the outcome in the surgical treatment of tuberculous fistulas. They advocate the use of sacral anesthesia and cauterization of the fistulous tract, feeling that this tends to stimulate fibrous tissue formation as well as destroying the tuberculous tissue and sealing off the lymphatics. Clusholm operated upon seventy-one tuberculous patients, obtaining a clinical cure in 98 per cent of the cases in from six weeks to three months. It is estimated that from 3 to 5 per cent of the patients having pulmonary tuberculosis develop anorectal complications and these are generally tuberculous in character.

#### MELANOSIS COLI

Zobel and Susnow<sup>13</sup> discuss this interesting condition of pigmentation in the colon which

oids can be treated by this method. The various types of injection solutions are reviewed, with the conclusion that 5 per cent quinine and urea hydrochloride has proved most satisfactory and is now used almost entirely in this clinic. The technic of injection is described in detail. There is usually no discomfort associated with the actual injection, but a stinging pain or ache often comes on twenty or thirty minutes later and lasts about an hour. An average of three or four injections at weekly intervals is given. Complications are few and rarely ever severe. During a two-year period there were thirty-two cases in which a slough occurred—five from the use of 5 per cent phenol in oil, and twenty-seven cases in which quinine and urea hydrochloride were used. In considering these figures it should be remembered that the great majority of cases were injected with the latter solution. None of these sloughs were severe and all subsided in a week or two. Severe pain occurred in three cases and prolapse of the hemorrhoid with thrombosis in seven cases. This was thought to be due to the fact that the prolapse was not replaced promptly after its occurrence. During the years 1929 to 1932, the number of cases of internal hemorrhoids operated on in the hospital steadily decreased from forty-two per year down to only five. (Since that time there has been a swing back to operation in an increasing number of cases because of recurrence.) Balch concludes that the injection treatment is satisfactory in 85 per cent to 90 per cent of cases of internal hemorrhoids, that it is almost painless, practically free from serious complications, and that most of the patients are satisfied with the results.

#### PRURITUS ANI

This symptom complex continues to be a source of concern both to the patient and to the physician attempting to treat the disease. There has been very little progress of any consequence in respect to a discovery of the real cause or of a satisfactory treatment which can be relied upon to cure all cases. It seems to be definitely established that many cases of pruritus are due to infection of the perianal skin with one or more of the various types of fungi. The prompt response of a certain number of cases to treatment with one of the fungicidal ointments bears out this statement. There is, of course, a great variation in the degree of discomfort experienced by sufferers from this trouble and in many instances the symptoms are very slight. There are, on the contrary, a certain number of people in whom the itching is so severe that one is justified in the use of rather radical measures directed toward alleviating the symptoms.

Haskell and Smith<sup>6</sup> have obtained satisfactory

results in the treatment of intractable anal pruritus by subcutaneous injection of 70 per cent alcohol following an equal amount of procaine solution previously injected in the same area. This dilutes the alcohol to a 35 per cent solution and makes the injection almost painless. The procedure is carried out in the office, injecting about one-fifth of the perianal area at intervals of four or five days. Of twenty-two patients sixteen experienced complete relief for a year or more, four were partially relieved, while two cases could be considered failures. There were small sloughs in six cases, and no serious complications. Injection must be carried out subcutaneously, not intradermally, and care taken to spread it evenly and to avoid getting into the sphincter or near the urethra in the male. This is essentially the method employed at the Mayo Clinic by Buie with good results.

#### EXPERIMENTAL WORK

Carlson and Orr<sup>7</sup> made kymographic tracings of the ileum and jejunum of normal dogs before, during, and after the administration by rectum of various enemas. Tracings of the ileum were taken through ileostomy openings, those of the jejunum through recently prepared Thiry Vella loops.

The results were as follows. Enemas of tap water and soap suds, physiologic salt solutions, and a mixture of magnesium sulphate, ox gall, glycerine, and water, and injections of air did not show any effect on the motility of the small intestine. Hypertonic salt enemas in concentrations of 2 per cent, 10 per cent, 20 per cent, and 36 per cent regularly increased peristalsis in from five to ten minutes, the greatest effect being in the strongest solutions. The stronger salt solutions produced severe proctitis. The practical effect of the study was to demonstrate that the ordinary weak enemas are of value only in emptying the colon and not in relieving small intestine distention.

The same authors<sup>8</sup> also conducted experiments with the application of heat locally on the abdominal wall in an effort to see whether there was any rise in temperature within the abdomen. They summarize several previous articles of a similar nature in which hot steam or jets of hot water were used, also the use of various diathermy applications, electric pads, infra red rays and so forth. No effect was noted from these methods except in the use of diathermy where a rise of 1° F was noted. In the authors' experiments the temperature was taken by the use of a long thermometer inserted through the anus into the midcolon. The use of heat for one hour on the abdomen of small dogs resulted in an average rise in temperature within the intestine of 1.2° F. Average rise in general body temperature was 5° F. Experiments on adults with



had developed on the polyps. Another died after hysterectomy elsewhere two years later. The remaining eight are alive, well and working.

LYMPHOPATHIA VENEREA (LYMPHOGRANULOMA INGUINALE)—THE ETIOLOGIC FACTOR IN "BENIGN" STRICTURES OF THE RECTUM

This disease continues to hold the interest of numerous investigators who are accumulating a steadily increasing supply of clinical and bacteriologic facts, establishing more firmly the interrelationship of the several manifestations of the disease. The Frei test described in 1925 by Wilhelm Frei, provides a means of establishing definite diagnosis in suspected cases. Its specificity seems to have been established almost beyond question by the universal experience of a number of writers who secure positive tests in the cases which fit the picture of the disease clinically and just as consistently secure negative tests in their control series. Bacon<sup>1</sup> has reviewed this particular angle of the situation very thoroughly and in his article quotes from the experience of a large number of writers. A total of one hundred and fifty-eight investigators from twenty-one different countries all recognized the value of the Frei test. In Bacon's own series of one hundred and fifty-five cases clinically diagnosed, one hundred and fifty gave a positive test. Three others had positive Wassermanns. Bacon carried out two hundred and sixty-four control Frei tests, all of which were negative. These results are typical of those obtained by numerous investigators.

A filtrable virus is considered to be the infective agent. Ravaut, Levaditi and Cachera transmitted the disease through a guinea-pig to a monkey, and several other workers have reproduced it in guinea-pigs.

The disease is characterized by a fleeting primary lesion of the penis or cervix or vagina with secondary infection of the inguinal glands, vulva, rectovaginal septum, or perirectal tissues. Elephantiasis of vulva or penis may occur. Acute and chronic proctitis with late stricture formation is common and often fistulas and granulomas of the anal outlet develop. Chronic inguinal adenitis with sinus formation should always suggest this disease.

Bacon's bibliography embraces one hundred and thirteen publications.

Ramey and Cole<sup>20</sup> report a series of twenty-three cases, all with positive Frei tests. All control tests were negative. It happened also that 28.5 per cent of their positive cases had positive Kahn tests. The syphilis was not considered to be a factor in the production of the strictures, however.

These authors report some success with the

use of antimony and potassium tartrate, using five to seven cubic centimeters of a 1 per cent solution twice a week for twelve to fifteen doses hypodermically. In several cases, however, toxic symptoms developed after injection—tachycardia, weak pulse, nausea and vomiting. Another patient developed weakness of the legs which lasted several days but eventually cleared up. The drug must be used cautiously.

Ramey and Cole mention a case in which the incubation period was known to be five weeks whereas ten days to three weeks is considered to be the usual period. They emphasize the severity of a general reaction often seen in women, especially Negroes, the fever reaching somewhat above 102° F. In this series, as in Bacon's, positive Kahn tests were obtained, 28.5 per cent positive in the stricture cases and 33.3 per cent in the cases with other manifestations of lymphopathia venerea.

Haves, Blair, and Harris<sup>21</sup> report negative Frei tests in over two hundred control cases. They secured positive tests in 85.7 per cent of cases with inguinal adenitis and in 60.4 per cent of cases with rectal strictures. They also found twelve patients in whom they secured both positive and negative tests using different antigens. The degree of reaction in a positive test they feel varies directly with the amount of antigen injected. They disagree with Sulzberger and Wise who stated that when both syphilis and lymphogranuloma inguinale are present the Frei test may be negative during the period of active syphilitic lesions and become positive after antisyphilitic treatment. Because of the difference in reaction with different antigens, in their own series they maintain that Sulzberger and Wise would have secured positive results earlier with other antigens.

Haves and his co-workers likewise suggest the possibility of this disease as well as gonorrhea being the etiologic factor in some urethral strictures (see paper by Gray abstracted below).

In a previous publication Haves had reported a large series of rectal strictures in which he considered gonorrhea to have been the basis of the trouble. He now desires to retract this statement, placing lymphogranuloma inguinale as the major cause but still feeling that some cases are due to gonorrhea or to five or six other causes.

These authors also report rather encouraging results by the treatment of this disease with intradermal injections of the antigen. Inguinal adenitis cleared up in ten cases and patients with rectal involvement became more comfortable.

Gray<sup>22</sup> has found eleven cases of lymphopathia venereum in the gynecological clinic at Johns Hopkins Hospital. Nine had positive Frei tests. All were seen first with a chronic abacterial urethritis, a condition first described by

was described first by Virchow in 1858. Varying in shade from a light grayish-brown to a deep brown, almost black, this pigment is considered to be melanin or closely akin to it. Bockus feels that laxatives of the anthracene group, the commonest of which is cascara, are important factors in the production of this condition. In two hundred proctoscopies Zobel and Susnow found melanosis in seven (3.5 per cent). All were constipated and all had taken cascara. The condition has no clinical significance, and will usually disappear in part when the laxative is stopped. (This latter point, and the relationship to use of cascara, has been confirmed in the experience of the Rectal Clinic at the Massachusetts General Hospital.)

#### ULCERATIVE COLITIS

Cattell<sup>14</sup> reviewed briefly the clinical course in acute and chronic ulcerative colitis, and the surgical indications in both types. The desirability of ileostomy rather than colostomy in cases with disease limited to the terminal or left colon was emphasized by the fact that in the only two cases in which colostomy alone was done the disease subsequently involved the colon proximal to the stoma. In two other cases in which the entire bowel distal to the stoma was resected, the remaining colon has been free from disease. The Lahey Clinic series, herein reported, consisted of sixty-three patients of whom one-third (twenty-one cases) came to operation. Ileostomy was performed fourteen times with five deaths, all in the acute toxic cases. One death was the result of perforation, one was due to coronary thrombosis, and three resulted from the severity of the disease, with the slight extra shock of the operation. Three patients were cured by complete colectomy in stages and six were submitted to partial colectomy for localized disease. If performed in divided operations, colectomy can be done with low mortality and is the only way in which the patient can be relieved, if ileostomy is insufficient to quiet the process.

McKittick and Miller<sup>15</sup> report the surgical aspects of a series of one hundred and forty-nine cases of chronic idiopathic ulcerative colitis from the wards of the Massachusetts General Hospital during a twenty year period. A review of symptoms places bleeding as an almost constant sign—mentioned in 87 per cent of the cases. Diarrhea always is present as would be expected, though constipation also may occur in the earlier stages. The mode of onset varied, being sudden in some cases, gradual in others, and remissions were characteristic of this series as of others. Sequelae included perianal infections, polyneuritis, hemorrhage and later polyposis. Proctoscopy was the chief aid in diagnosis, with barium enema next as an ad-

junct. There were twenty-seven deaths in the series of one hundred and forty-nine cases, an 18 per cent mortality—the chief causes being peritonitis from perforation, widespread sepsis, pneumonia, and liver abscess. Ileostomy is favored as the surgical procedure of choice in the intractable cases and is often a life saving procedure in conjunction with transfusions. Eventually 40 per cent of the series were submitted to this operation, and about 40 per cent of those surviving it demand subtotal colectomy because of later continued hemorrhage or failure of the infection to subside. The results of this radical procedure are excellent.

Bargen and Dixon<sup>16</sup> report twenty five cases of carcinoma and two of lymphosarcoma superimposed on long-standing cases of chronic ulcerative colitis. A sudden increase in bleeding with development of pain seemed to mark the onset of the change. The symptoms of the two diseases are so much alike that the necessity of prompt proctoscopy in case of any increase in symptoms in a case of colitis is quite evident. Partial or complete colectomy, under these circumstances, would seem to be indicated. The five cases which survived this procedure had preliminary vaccination with the Bargen diplostreptococcus vaccine, concentrated serum, or both, whereas only seven of the twenty two cases which died had been given this treatment.

Dr Henry W. Cave<sup>17</sup> presented a case of a fifty-four year old man who began to develop symptoms of large bowel obstruction with passage of some blood and mucus. He was proctoscoped and it was felt that the lesion was a cancer of the rectum. Biopsy came back as inflammatory tissue, but nevertheless the growth had the typical appearance of carcinoma. Because of the fact that the patient had been in Chicago during the spring and summer of 1933, examination of stools was made and showed numerous *Entameba histolytica*. Barium enema showed narrowed lumen of the colon and smoothing out of haustral markings characteristic of colitis. Operation was deferred, and after being given treatment for amebiasis, the growth diminished and eventually completely disappeared. A very similar case has been seen recently at the Massachusetts General Hospital. Although these lesions are not common, they must be considered in the differential diagnosis from cancer.

Rankin<sup>18</sup> has added five cases to a previously reported series of six cases of complete colectomy for either ulcerative colitis or diffuse adenomatosis. He operates in three stages: first, adenomatosis; secondly, colectomy to the rectosigmoid junction; and lastly, removal of the rectum. There was only one operative death in the series. Of the eleven cases, one died eighteen months later of recurrence of carcinoma which

Quiroga and Bosq<sup>30</sup> report twenty-nine cases of "inguinal lymphogranulomatosis" from the Dermatovsyphilographic Clinic of Buenos Aires in the years 1929 to 1934. Of these cases the primary lesions persisted at time of admission in eleven. Three of these are described in detail. Five cases also had syphilis. All cases had adenitis and all but one developed skin sinuses from the infected glands.

Pennoyer<sup>31</sup> reports twenty-two cases of benign rectal stricture from the Outpatient Department of Roosevelt Hospital, New York City, over a three-year period. Of these there were seventeen colored women, three white women, and two men. In no case could gonorrhea, syphilis, or tuberculosis be established as a cause of the stricture though five patients had positive Wassermanns. The author considers all the cases to be due to lymphogranuloma inguinale, and positive Frei tests were obtained in 81 per cent of the cases.

Another series of cases of lymphogranuloma inguinale, largely in Negroes, is reported from the New Orleans Charity Hospital by Lichtenstein<sup>32</sup>. In a four-month period one hundred and fifty-four cases were seen. Fifty-eight of these had rectal strictures and fifty-five had positive Frei tests. Two others were questionable and one was negative. There was only one male in the fifty-eight cases, and fifty-five of the fifty-eight were Negroes. Ten had positive Wassermann tests.

Five stricture cases came to autopsy, two of which had positive Frei tests during life.

J. P. Lockhart-Mummery and O. V. Lloyd Davies<sup>33</sup> describe an operation applicable to certain types of fibrous stricture of the rectum. It is performed posteriorly under spinal anesthesia in the Sims position, the coccyx is removed, and the rectum freely mobilized. The stricture is divided longitudinally into the rectum extending to healthy bowel above and below. This incision is then sutured in the other direction over a large rubber tube which is passed through the anus and through the area of operation. By closing the opening transversely the caliber of this area is thereby increased and the stricture eliminated. The article reports only a single case in which this operation has been done. The stricture was three inches in length and lay in the middle and upper rectum. In this particular case a good result was obtained, but it is obvious that one could not expect so fortunate an outcome in many cases, due to fistula formation and the inability of scar tissue to heal properly. Colostomy and careful washing out of the bowel is advised as a preliminary to the operation.

Bacon<sup>34</sup> has devised an ingenious instrument or series of instruments, varying in diameter from one-half to one-eighth inch, calibrated in centimeters along the barrel and designed for

the purpose of determining both the diameter and the length of rectal strictures. It is a proximally lighted instrument. The author makes his examination with the patient in knee-chest position just as in the usual proctoscopy. This instrument would seem to have a definite value more particularly in determining the length of nonmalignant strictures with a view to deciding in advance the best method of treatment. Bacon has also devised a self-retaining speculum or short proctoscope which is illuminated by a distal light on a removable carrier.

#### TUMORS

Raven<sup>35</sup> reviews the embryology of the sacrococcygeal region to explain the inclusion of epithelial structures in this locality. These lesions fall into the general head of cysts and tumors. The commonest lesion in this locality is the pilonidal cyst and sinus which is familiar to most of us. In addition, dermoid cysts are found between the rectum and the sacrum, sometimes on the perineum, and occasionally in the ischiorectal fossa. The author has reviewed various specimens from the museums of St. Bartholomew's and Guy's Hospital and other sources. Teratoma is the commonest tumor of the sacrococcygeal region. Several interesting museum specimens are reproduced together with case histories. The author in conclusion states that the origin of these tumors is not known but they are presumably due to some malformation in the development of the tissues in this area.

Rosser<sup>36</sup> enumerates the various benign tumors occasionally found in the rectum—fibroma, lipoma, myoma, angioma, endothelioma, dermoid—and the common benign lesion the adenoma. Multiple adenomatosis is apparently a familial disease in some instances. In Doering's series of fifty cases, thirty-one died eventually of carcinoma, illustrating the known high incidence of malignant degeneration.

The rather common occurrence of another benign tumor, the eleoma, is a result of the injection of oil solutions beneath the mucosa in the treatment of internal hemorrhoids or prolapse of the mucosa. A series of such tumors was reported by Rosser<sup>36</sup> in 1932.

Lymphoma and sarcoma occasionally occur in a ratio of about one case to two hundred carcinomas.

Rosser emphasizes in closing, the necessity of a careful intelligent visual examination of the rectum in order to diagnose the presence of carcinoma which occurs in the rectosigmoid in 65 per cent of cases.

Smith and Broders<sup>37</sup> describe two cases of melano-epithelioma and two cases of hemangio-endothelioma of the anus, seen at the Mayo Clinic. They are of interest because of their rarity, and because of the highly malignant nature of the former. The latter type of tumor

Waelsh in 1904. Curth, in 1931, described a male with enlarged inguinal nodes and urethritis. Smear showed leucocytes but no bacteria. The Frei test was positive. In 1932 Frei himself reported a similar case. Kalz, Polak, and Bezeeny have recorded other similar cases.

The pathology of the disease, and its treatment, are reviewed, and the suggestion made that transfusions from a known healed case may offer possibilities in treating the disease.

Martin,<sup>23</sup> in a paper read before the American Proctologic Society, emphasizes the tendency of Negroes to form scar tissue, and the resulting extreme reaction to infections with lymphopathia venerea. Bacon's paper, quoted above, is based on the same series of cases, the series being the joint product of six Philadelphia men in several hospital services as well as in private practice. Martin mentions the rapid increase of these cases in Sweden, Germany, France, and Roumania.

Redell<sup>24</sup> reports one case with rectal involvement in which treatment with Frei antigen produced considerable improvement in the passage of stools.

J. P. Nesselrod,<sup>25</sup> working at the University of Pennsylvania under the direction of Dr. O. V. Batson, injected the lymphatics of human fetuses at or close to birth and was able to demonstrate the lymphatic pathways of the genitalia and rectum in a very convincing fashion. The gross specimens were rendered transparent by Batson's modification of the Spalteholz technique and the lymphatics then injected with either mercury or Gerota's solution. The lymphatic pathways were clearly outlined, and demonstrated conclusively the intimate connection between the lymphatic pedicles of the cervix and posterior vagina and those of the lateral rectal walls, through the uterosacral ligament and through the rectovaginal septum. In the male the drainage from the anterior urethra is directly to the inguinal glands, though there is a connection between the posterior urethra and prostate and the perineal lymphatics. These facts seem to explain satisfactorily the fact that rectal involvement in lymphopathia venereum is much more common in the female than in the male.

Dr. Nesselrod's specimens are well worth a careful study by anyone visiting the Mayo Clinic.

Bezeeny and Sagher<sup>26</sup> report a case of a man with ulceration of the tongue and swelling of the lymph nodes of the left side of the neck in whom tests for syphilis were negative and the Frei test positive. The patient had had perverted intercourse with a woman who four years previously had a disorder of the inguinal lymph nodes. The author emphasizes that caution is necessary in declaring a patient with lymphogranuloma inguinale cured, for in this instance

the woman was apparently cured, and she again became a source of infection four years later.

Von Haam and D'Aunoy,<sup>27</sup> impressed by the evidence suggesting lymphogranuloma inguinale to be a generalized or systemic infection, undertook some studies of the spinal fluids of a number of cases in the acute stage of inguinal adenitis. Fever and headaches, often encountered, suggest the possibility of cerebral involvement. Spinal fluid from these cases, all of which had positive Frei tests, was injected into white mice. In two instances the spinal fluid inoculation transmitted the disease to mice, and an emulsion of the brains of these mice later on produced strong cutaneous reactions in human beings with the disease. The evidence suggests a generalized dissemination of the virus in the early stages of the disease comparable to that which occurs in syphilis.

Strauss and Howard<sup>28</sup> did some experimental work in connection with mouse brain antigens in the diagnosis of lymphogranuloma inguinale. The usual antigen is prepared from sterilized pus obtained from unruptured inguinal buboes in a known human case. The disease can be readily transmitted to mice by intracerebral injection of the unsterilized pus, and mouse brain antigens have been subsequently used by several authors as material for diagnostic Frei tests. One antigen of this type is now on the market. The experiments of Strauss and Howard showed that mouse antigens, both the commercial and their own preparations, produced a five to seven millimeter papule in normal control subjects, whereas the antigen prepared from pus did not. In other words, the mouse brain antigens produced false positive Frei tests. This was true, whether or not the mouse had been infected with the disease, showing a sensitiveness on the part of the control to the mouse brain itself. Reactions were more pronounced using material over a month old. The papules, it is true, were larger in the cases where the mouse brain antigen came from an infected mouse.

The authors conclude that the old style antigen made from the human pus is much more reliable as a diagnostic agent.

Dick<sup>29</sup> reports two cases of children who showed positive Frei tests, the mothers being known to have lymphogranuloma inguinale. In one case, that of a fourteen year old girl, infection could have occurred in any one of three ways, during intrauterine life, at birth, or by contact with the mother later on. In the second case, however, that of a baby, the Frei test was positive two weeks after birth and again five months after birth. If one accepts the idea that Frei tests do not become positive in adults for several weeks after infection, it would appear that this baby probably became infected in utero.

which is rather too extensive to attempt to cover in this outline

Dixon<sup>13</sup> reports twelve twenty-year cures of carcinoma of the colon from the Mayo Clinic. All the specimens were diagnosed as cancer at operation, all were preserved in the gross and resectioned and the diagnosis confirmed for this study.

Of interest is the fact that all were of a low grade of malignancy: six of grade one and six of grade two.

Likewise of interest are some statistics on four hundred and fifty-three cases of carcinoma of the colon graded as follows: Grade 1 14 per cent, Grade 2 61 per cent, Grade 3 15 per cent, and Grade 4 7 per cent.

Statistics on five-year cures were as follows: Of the Grade 1 cases 66 per cent survived, of the Grade 2 cases 54 per cent, Grade 3 35 per cent, and Grade 4 30 per cent.

With regard to presence of lymph node metastasis at operation only 33 per cent of those with metastasis survived five years, while 60 per cent of cases without lymph node involvement survived.

Strauss<sup>14</sup> and his associates have treated seventy-three cases of cancer of the rectum considered inoperable by surgical diathermy through a specially constructed glass proctoscope. Three cases died rather promptly after the treatment but in the others the authors feel that a great symptomatic improvement resulted from the partial destruction of the tumor; the patients even gaining weight and the hemoglobin and red count rising. Gain in weight from fifteen to fifty pounds occurred in some cases. It is stated that a number of patients were observed for from three to six years after this treatment retaining their weight, color, and healthy appearance. Most of these cases were not transfused and all received diathermy alone. Twenty-two of the patients were not subjected to colostomy, whereas the others were. Both groups did equally well. It is suggested that this electrocoagulation inhibits further progress of the disease along the lymphatics and that it not only produces mechanical destruction of the tumor but throws off into the circulation certain antibodies which immunize the patient against further progress of the disease. They cite one case in which a low carcinoma was apparently cured and five years later the resulting contracted scar was excised and an anastomosis performed. Many of the patients had some fever for several days after treatment. Five had severe hemorrhages from the tenth to twelfth day necessitating packing. Rectal abscess developed in one case. The number of treatments given varied from one to four. One death resulted from peritonitis, another from pneumonia shortly after treatment. The authors in conclusion go on record as favor-

ing the radical removal of carcinoma of the colon when it can be done without a colostomy, but favor their method of treatment in tumors of the sigmoid and rectum in preference to radical removal with permanent colostomy.

Many of us I am sure, will find it difficult to believe that any except the very earliest cases of cancer of the bowel can be cured by this method, although the authors of this article seem to infer that many of their patients do live for considerable periods without recurrence.

Binkley<sup>15</sup> whose experience with radium treatment in cancer of the rectum is probably as extensive as that of any other surgeon reports on his results in the use of gold radon seeds. This type of treatment was used largely in the inoperable group of cases. External radiation is useful in all advanced cases which are ambulatory. The use of radon seeds inserted in the tumor is applicable to only about 50 per cent of advanced cases, those in better physical condition. Binkley stresses the importance of the technique of application, which is difficult and must be carried out so as to produce radiation of all areas of the tumor. The technique is discussed in detail together with the selection of cases. He reports twenty-four patients treated prior to 1933 who are clinically free of cancer of the rectum. In the period 1926-1930 inclusive two hundred and thirty-eight patients were treated by radiation therapy alone or in conjunction with colostomy. Two hundred and thirteen were advanced cases. Eight and one-half per cent did not appear to be benefited. 19 per cent received minimal palliation, the remaining one hundred and fifty-five cases received heavier dosage. Of the total group one hundred and eighty-three lived over six months, one hundred and twelve over twelve months, sixty-five over eighteen months, twenty over thirty months, nine for more than three years, and one case for four and two-thirds years. In addition to this group another twenty-five cases, fifteen of which were considered operable, were subjected to very heavy therapy. Twelve of the cases had colostomy. Of the twenty-five thirteen are now alive and free of local disease.

#### INTRAPERITONEAL VACCINATION

Potter and Coller<sup>16</sup> report on seventy-nine patients vaccinated with a preparation provided by Dr. B. Steinberg known as coli-bactrigen, which consists of two hundred millions of heat-killed *B. coli* per cubic centimeter suspended in 1 per cent gum tragacanth in normal salt solution prepared in ampules of thirty cubic centimeters each. Most of the cases in which this was used were cases of carcinoma of the colon. Injection of the entire ampule is given through a spinal puncture needle a little below the umbilicus about forty-eight hours prior to

is considered to be malignant also. In one case of each type, diagnosis was made only by the pathologist after removal of what were thought to be hemorrhoids, suggesting the value of pathologic examination of these tissues which are usually discarded at the time of operation. Three of the cases were alive and well at the time of this report, but the first case (a melanoma) died of generalized metastatic disease about a year and a half after complete local removal and radiation of the local area and the inguinal glands.

Junghanns,<sup>33</sup> from Schmieden's Clinic, reports a careful pathologic study of one hundred and thirty specimens of cancer of the colon and rectum in which 70 per cent showed unquestionably that cancer had developed on a polyp. Of these, twenty-seven were villous tumors, and this latter group, with one other cancer, was subjected to particular study. The incidence of premalignant and malignant change was so high in these tumors that radical resection, as in cancer, is advocated.

A careful dissection of specimens of cancer of the rectum removed at operation in one hundred cases was carried out by Gabriel, Dukes and Bussey.<sup>39</sup> Seventy were operated by the abdominoperineal method and thirty by perineal resection alone. The specimens were stretched on frames, directly after removal, to avoid shrinkage from their normal dimensions. All lymph nodes were carefully dissected out and studied and recorded on drawings. An average of twenty-eight per specimen was recorded with a high number of sixty.

Metastases in glands were found in sixty-two of the one hundred cases, but in half of the cases they occurred in only three glands or less. The authors feel that no lymphatic spread occurs *downward* from the growth until the immediate perirectal lymph channels and those above along the superior hemorrhoidal vessels become choked with metastases.

It was of interest that, in the two thousand nodes examined, those considered negative grossly usually proved to have no tumor involvement, whereas those which were thought to look cancerous grossly proved to be only inflammatory in 61 per cent of instances.

The prognosis was very grave in cases showing metastasis up to the point of ligation of the superior hemorrhoidal vessels. Distant metastases were considered to have taken place by the vascular route in several cases where they were present at operation though the lymphatic channels from the tumor were negative. A number of cases with metastases locally but not up to the point of ligation of the superior hemorrhoidals did very well clinically, showing that the disease had been completely eradicated.

In the symposium, *Cancer is Curable*, at the 1934 meeting of the American College of Surgeons, A. Lawrence Abel<sup>40</sup> of London presented statistics on a ten-year series of cases of cancer of the rectum from the Cancer Hospital in London. The operations were done by different members of the staff, with the following end results. The report is based on one hundred and sixty-four *survivals* of operation, the operative mortality not being stated. Of the *survivals* forty-seven died in less than five years while one hundred and four were alive and well five years and longer, giving a percentage of five-year cures of 63.4. In considering this percentage, which is quite high in comparison with our best statistics in America, two things must be considered, namely, that this figure is based only on *survivals* after operation, and secondly, that the percentage of operability of the surgeons in that hospital, as expressed in other publications, is about 32 per cent of the cases of cancer of the rectum seen, whereas a number of leading operators in this country remove the growth in 60 per cent to 65 per cent of cases seen.

T. E. Jones<sup>41</sup> of the Cleveland Clinic reports a series of one hundred and fifty-one personal cases of cancer of the rectum all operated by a one-stage abdominoperineal resection with only sixteen deaths, a mortality of 10.5 per cent. Jones outlines his preoperative treatment which consumes about a week devoted to careful clearing out of the bowel and to general preparation of the patient. Details of his technique are given in full, with drawings, and also the elements in his postoperative regime. His results are a tribute to his careful preparation, unusual finesse and speed in operating, and intelligent aftercare. He uses spinal anesthesia.

Raiford<sup>42</sup> has analyzed all the cases of cancer of the colon and rectum admitted to the Johns Hopkins Hospital on the wards since 1889. During this forty-two year period five hundred and eleven cases were admitted. Of these one hundred and ninety-two were in the colon and three hundred and nineteen in the rectum. The author has classified the colon cases according to their location and found 35 per cent in the cecum and ascending colon, 37 per cent in the descending colon and sigmoid, and 9 per cent, 7 per cent and 5 per cent respectively in the hepatic flexure, transverse colon and splenic flexure. The various types morphologically are discussed and likewise the microscopic pathology. This article also gives a very complete analysis of blood studies in the various cases, prognosis according to pathology, location of metastases, types of operation, and results, together with a discussion of symptomatology, and so forth.

This is an excellent bit of statistical work.

**CASE RECORDS**  
*of the*  
**MASSACHUSETTS GENERAL  
HOSPITAL**

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT, M D

TRACY B MALLORY, M D, *Editor*

CASE 22461

PRESENTATION OF CASE

A 76 year old native physician entered complaining of upper abdominal pain

About 8 years before entry the patient had recurrent attacks of gnawing epigastric pain relieved by food. An x-ray taken at this time was said to show an ulcer. He was treated by diet and the pain subsided. He had recurrences of similar pain, particularly when he was overtired or after eating spicy foods. Each attack lasted several weeks and was usually relieved by a dietary regime. During the 3 or 4 months preceding entry the patient was comparatively free from symptoms until 2 weeks ago, when abdominal discomfort recurred with unusual severity. The pain was aching in character and constant, although there were occasional periods of partial subsidence. Associated with the pain there was considerable emesis of bile-stained material and an increase in constipation which had been present for several years. During the past 6 years there were occasional light colored stools, sometimes noted in association with the attacks of abdominal discomfort. There was no jaundice, chills or fever. Recently there was some weakness and loss of vigor. For many years the patient noted moderate dyspnea with exertion. He required two pillows at night in order to rest comfortably.

Physical examination showed a well-developed, ruddy-faced, elderly man with slight brownish pigmentation of the arms and hands. Throughout the examination the patient complained of discomfort in the right upper quadrant and epigastrium. The sclerae showed a questionable icteric tint. The heart was not enlarged. The sounds were regular and there was a systolic murmur in the aortic region. The peripheral vessels were sclerosed and moderately tortuous. The blood pressure was 115/80. The lungs were clear. The abdomen was soft but tenderness was elicited in the right upper quadrant. The liver edge was barely palpable.

The temperature, pulse, and respirations were normal.

Examination of the urine showed a specific

gravity of 1.019 with a trace of albumin. The sediment was negative. The blood showed a red cell count of 5,200,000, with a hemoglobin of 90 per cent. The white cell count was 10,900, 84 per cent polymorphonuclears. A stool specimen gave a negative reaction to the guaiac test. The nonprotein nitrogen of the blood was 40 milligrams. The blood sugar was 130.

An electrocardiogram on the day of admission showed evidence of intraventricular block of the left branch type with a Q-R-S interval of 0.14 seconds.  $P_1$  and  $P_2$  were notched and the P-R interval was 0.2 seconds. Q-R-S<sub>4</sub> was inverted and M shaped. T<sub>4</sub> showed late shallow inversion.

A Graham series showed a normally functioning gallbladder. A barium enema filled the colon readily. Gas and feces were present and complete visualization of the hepatic flexure was not possible. The cecum was rather large. A chest film showed some prominence of the heart in the region of the left ventricle and the apex was blunted. The aorta was markedly tortuous and somewhat dilated. The lung fields were clear. A gastrointestinal series showed a normal esophagus. The stomach contained fluid residue at the beginning of the examination. It was large and atonic in appearance and no defects were noted. The first portion of the duodenum, however, was grossly deformed and there was acute tenderness on palpation directly over the cap. The deformity was so great that it was difficult to identify a definite ulcer crater. The duodenal loop was not remarkable. At the end of 24 hours there was still a large residue present in the stomach. At this time several small diverticula were noted in the sigmoid.

During the night, 48 hours after entry, the patient had a desire to defecate. While straining he suddenly felt faint and lost consciousness momentarily. His pulse became weak and the blood pressure was 85/60. The skin was cold and clammy. He recovered rapidly and the pulse tension improved although occasional premature beats were palpable. Shortly afterward he again had a desire to defecate and went through the same cycle. There was no associated pain until after the second attack, when gnawing abdominal discomfort appeared in the right upper quadrant. He was given a small dose of morphin and on the following day his blood pressure was 100/50. At this time his skin was cold and moist and his pulse rather weak and rapid. No pericardial friction rub was heard and the abdomen although soft was slightly distended. A gastric aspiration produced 32 ounces of brownish black fluid containing a few small particles suggestive of blood clots. Another electrocardiogram showed auricular and nodal premature beats with a rate of 80. There was left bundle branch block and the S-T complexes were slightly convex. Q-R-S<sub>4</sub>

operation. Some pain occurred in most of the cases within two or three hours after injection and persisted for periods up to thirty or forty hours. Morphine was required in more than half of the cases. Evidence of peritonitis was present in most of the cases together with a rise in temperature within four hours and increased leucocytosis. At operation increased peritoneal fluid was present. Various types of operations were performed, thirty six being combined abdominoperineal resections. There were eleven deaths, a 14 per cent mortality. There were no fatalities as a result of injection.

The authors feel that the vaccination was of definite value inasmuch as only one case among the deaths was due to peritonitis.

A careful experimental study has been carried out by Johnson et al.<sup>47</sup> in an effort to determine the relative merits of several substances which have been used for peritoneal vaccination. Seventy dogs were used in this investigation. Normal saline with and without merthiolate, papain, and sodium ricinoleate were used as control solutions, and the substances tested were colon bacillus vaccine and bovine amniotic fluid concentrate.

The results showed the latter substance to be the ideal activator of peritoneal immunity because of its harmlessness, quickness of action and stability. The colon vaccine was also effective but produced more reaction clinically and physiologically than did the amniotic fluid concentrate.

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to perforate. It was only a few hours before death that he had abdominal pain, whereas he had been acutely ill for 2 or 3 days. I am discounting the electrocardiogram, since it is equivocal and not definite either way. I would say the onset of the final illness during the hospital stay is more characteristic of acute hemorrhage than of coronary thrombosis. So that on the whole I will bet, and as I say I am not sure whether I am remembering the discussion of a case similar to this which possibly may be the same, that the ulcer was the cause of his death and that he died of gastrointestinal hemorrhage.

#### X-RAY INTERPRETATION

DR AUBREY O HAMPTON. His duodenum as you see, is markedly deformed and it would be very difficult from these films to tell what the deformity is due to. There is very little filling of the duodenum over an area of two and a half inches. Here is a film that shows what looks like a crater. It is rather large. This film was taken with the patient lying on his back. Here you have two shadows, one which looks like the cap and one within it. This is the constriction distal to it. One of these shadows could be an ulcer and this the deformity of inflammatory reaction around it. The ulcer would be on the posterior wall since these films were taken with the patient on his back. Films taken in the face down position very often do not show these ulcers so well. We can agree that he had a large posterior wall duodenal ulcer which would be the type that bleeds. He had an obstruction. This ulcer obstructed the duodenum. Here is a 24 hour film and there is a large residue in the stomach.

We have a barium enema that shows gas in the colon. It is a poor preparation. I do not see much else. There is spasm of the sigmoid and a dilated cecum which does not stay dilated. It is not dilated in the examination at 24 hours. He had a normal gallbladder. Here is the heart and chest. It is not measured, but I would say the heart is slightly enlarged. There is haziness at the left base which might mean pleural thickening. The remainder of the lung fields is clear. The aorta is tortuous and there is calcium in the arch.

#### CLINICAL DISCUSSION

DR HOWARD B SPRAGUE. I saw this patient once because of the question of whether he was in suitable condition for operation. It was the morning after the first episode of weakness. I found him sitting in a chair seeming to be in very poor condition. His systolic blood pressure was around 80. The heart sounds were of poor quality. I thought that he had coronary disease, presumably an old coronary process perhaps

with infarction. I may have been influenced somewhat by having had a patient with Dr Jones some years ago in whom gastric hemorrhage produced coronary occlusion. I felt that this man should definitely be in bed and was in no condition for operation at the moment. I favored at that time coronary narrowing and probably a small recent occlusion. Some of the findings which were reported later were rather confusing and I never saw him again. There was a statement that no blood was definitely found in the gastric contents after his stomach was emptied by tube following this first attack. However, at that moment I was betting on a coronary attack rather than hemorrhage.

DR PALMER. Do you think the appearance of the electrocardiogram was characteristic of additional coronary damage?

DR SPRAGUE. No, I agree that it is within the limits of error in the placement of the electrodes. The second tracing was taken after I saw him.

#### CLINICAL DIAGNOSIS

Coronary thrombosis

DR ROBERT S PALMER'S DIAGNOSES

Arteriosclerotic (coronary) heart disease

Chronic duodenal ulcer with scarring

Cause of death: acute gastrointestinal hemorrhage

#### ANATOMIC DIAGNOSES

Chronic ulcer of the pylorus with erosion of the pancreaticoduodenal artery and fatal hemorrhage

Coronary thrombosis, old

Infarct of the heart, old

Adhesive pericarditis

Carcinoma of the prostate with metastasis to the liver

Aneurysm, arteriosclerotic, left iliac artery

Arteriosclerosis, generalized

Pulmonary emphysema

Bronchopneumonia

Diverticulosis of the colon

#### PATHOLOGIC DISCUSSION

DR TRACY B MALLORY. There was a certain amount of confusion in this case regarding the results of the two gastric lavages. The first one you have heard described. It was brownish but since it had been done almost immediately after the attack it seems as though if there had been a severe gastric hemorrhage one would have obtained abundant fresh blood. This was certainly not present in any significant amount. The guaiac test was reported after the patient's death and was positive. In the second gastric lavage there was apparently no blood at all. At postmortem, however, we found an

was unchanged but  $T_4$  was upright. During the fourth hospital day the patient complained of abdominal pain and several hundred cubic centimeters of light brown curdled fluid was removed by gastric lavage. The pain abated but a few hours later returned. It was gnawing in character and present over the epigastrium and left side of the abdomen. Physical signs in the chest were unchanged but the blood pressure was 70/40. The patient was treated with sedatives and during the evening of the sixth day he again complained of severe abdominal pain, became cold, clammy, and pulseless. There was associated shortness of breath and finally some substernal discomfort. He was given large doses of morphin and oxygen by nasal catheter. The discomfort continued, however. He became rapidly weaker and died early the following morning on the seventh hospital day.

### DIFFERENTIAL DIAGNOSIS

DR ROBERT S. PALMER. I have a confession to make. I am striking for Dr. Means and I took this case on short notice. Since I have read it over I think I may have heard it discussed, but I will try to be as impartial as I can.

Significant by its absence is any relation of this patient's symptoms to exercise. Indigestion on exercise or attacks of so called acute indigestion are common, of course, in coronary disease which a person of this age might have. Not only are the symptoms not characteristic of a coronary episode but we also have the x-ray finding of an ulcer to explain them. Not having said exactly where the x-ray located the ulcer, one wonders if it were not in the stomach and if the man were not suffering as a matter of fact from carcinoma of the stomach, but as we shall see later, this seems less likely. The hemoglobin is against carcinoma and is against a bleeding ulcer as well.

The electrocardiogram showed left bundle branch block, depressed ST, and upright and diphasic  $T_2$ , with inversion of  $T_1$ . The intraventricular block does not necessarily mean any acute affair. The widening of Q-R-S does mean coronary disease, most often sclerotic, but sometimes luetic. The alterations in lead 4 are related to the intraventricular block and do not represent acute coronary closure.

The x-ray shadow of the heart has the appearance of rheumatic disease but the prominent left border is consistent with coronary sclerosis and hypertrophy.

If the lesion is in the duodenum statistically it cannot be carcinoma, even in an old man with a long continued gastric history. Even if they did not see crater formation I assume it is an old ulcer with a great deal of scarring, the

kind of lesion especially subject to copious hemorrhage, perforation being much less likely.

There was no associated pain until after the second attack, when "gnawing abdominal discomfort appeared in the right upper quadrant." That is very important. It is unusual for a person to have a coronary thrombosis, the first sign of which is fainting. On the other hand it is not uncommon for severe angina and coronary thrombosis to occur while straining at the stool. The pain here is not characteristic of coronary thrombosis although there is a saving that anginal or coronary pain tends to radiate to diseased organs other than the heart. You can have coronary thrombosis without any pain but, if so, usually there is paroxysmal shortness of breath. I think the kind of ulcer that an old man would have would be one with a lot of scarring and be more likely to bleed than to perforate, and I believe the figures bear this out. So the picture that is described so far can be due to gastrointestinal hemorrhage, with coronary thrombosis the second thought.

"No pericardial friction rub was heard." That often is not heard and sometimes the pathology is in the back of the heart and you cannot hear it anyhow.

"The abdomen, although soft, was slightly distended." That certainly is very much against perforation.

They do not say what the guaiac was, but I suppose it was positive for blood.

The electrocardiogram, as I said, is characteristic of coronary thrombosis. This ought to be the deciding thing, where there is one before and one after the attacks, and the whole thing to decide on is the basis of differences in the two tracings and how much difference there is. These electrocardiograms show the same thing within the limits of technical error, I should say, except that the T waves in lead 1 of the second tracing are more typical of those associated with coronary thrombosis. They show late inversion, the cove plane type. A few extrasystoles are shown here. So far as I know that does not mean anything either way. The lead 4 changes depend a good deal on where the chest electrode is placed, and that often accounts for this much difference.

I still wonder about the guaiac test on the gastric fluid and whether any tests were done on fecal material passed spontaneously or obtained by enema.

There are only two things to consider. He could have died from coronary thrombosis of which the later symptoms are suggestive. On the other hand, if he had acute hemorrhage with blood loss a man even with a normal amount of coronary sclerosis at this age might have symptoms of coronary insufficiency. The other cause of death would be ulcer. As I have said the kind he had would be more likely to bleed than

deformity of the esophagus was rather fixed, constant, and in the lateral view a one centimeter projection was seen on the anterior wall. This simulated an ulcer crater, but it was felt that it probably represented the attachment of the esophagus to the aorta. The entire esophagus was flattened in the anteroposterior direction and barium passed through it slowly. The anteroposterior diameter of the chest was unusually narrow, particularly at the diaphragm and retrosternal space. The trachea was displaced toward the right and posteriorly. The stomach was low and atonic. At the end of 6 hours the motor meal had reached the splenic flexure. Additional films of the trachea taken in the lateral view showed marked narrowing and posterior displacement of the trachea. It was not possible to see any air in the trachea opposite the mass.

Esophagoscopy showed a narrowing of the upper third of the esophagus produced apparently by an extrinsic mass on the left side. The mucosa over this mass was normal. A biopsy was taken. She was discharged on the sixth day to return 2 days later.

During the interval her dyspnea had increased. Examination of the chest showed consolidation at the left base. Because of the marked dyspnea a tracheotomy was performed and a tube inserted. She rapidly went downhill and died two days after her second admission.

#### DIFFERENTIAL DIAGNOSIS

DR JOHN D STEWART. The opening sentence of this case history focuses our attention on the upper half of the esophagus with a suggestion that the esophagus and a recurrent laryngeal nerve are involved in the same process. The symptomatology developing 2 years before admission is interesting. Bilateral symmetrical numbness and tingling of the hands and a raw red tongue strongly suggest a chronic nutritional disturbance, such as avitaminosis or pernicious anemia. The response to administration of iron was apparently satisfactory. Presumably the diet was improved in other respects also or else pernicious anemia may be discarded in the diagnosis for, of course, iron alone does not bring relief in this disease.

Two months before admission our attention again is directed to the thorax by a sharp stabbing substernal pain. Furthermore, the pain was aggravated by swallowing. Five weeks before admission a dry hacking cough with little sputum set in but no blood was raised. This suggests a lesion producing irritation in the trachea or large bronchi possibly by pressure from without. Difficulty in swallowing solids liquids being more easily taken, usually means

interference with the esophageal lumen. The night sweats do not necessarily mean fever or infection for sweating is common in nonsuppurative thoracic conditions.

The bloodless diarrhea of several weeks' duration occurring 4 years before admission is difficult to relate to the present illness and without more information must remain indefinite. The conceivable chain of events amebic dysentery, liver abscess, penetration of the diaphragm and thoracic symptoms, seems very improbable.

At physical examination the important points seem to be wasting and pallor and a firm irregular mass presenting in the neck from the superior mediastinum. The urine contains a slight trace of albumin and white blood cells in the sediment. Without other evidence of renal disorder such as red blood cells and casts these findings may be taken lightly. The blood and sputum examinations showed no significant abnormality.

The x-ray here, as in many other cases with thoracic symptomatology, is very helpful. An extensive mediastinal mass is described which seems to compress the esophagus and trachea from in front, apparently as an extrinsic lesion. Esophagoscopy confirmed this impression. One would like further information in this case, particularly as regards the fluoroscopic appearance of the aorta in relation to the mediastinal mass. Also, we have no observations regarding the presence of Horner's syndrome or vocal cord paralysis. We may assume the absence of signs of superior caval obstruction, such as facial surfusion and venous distention, since these are unrecorded in the physical examination.

We have then as a problem in differential diagnosis a large mass situated chiefly in the superior mediastinum. Aortic aneurysm cannot be excluded without more evidence than that given us for the negative blood Hinton is not sufficient. The extensive size of the mass and the absence of cardiac murmurs and vascular thrills incline us to discard the diagnosis of aneurysm. Assuming that the mediastinal mass is not aneurysm we have to make a diagnosis of either cystic or solid tumor. Such mediastinal cysts as dermoid or echinococcus cyst seem unlikely here. If the tumor is a solid tumor, is it benign or malignant? From the rapid progression of symptoms and evidence of invasiveness I am inclined to favor a malignant tumor and pass over such possibilities as intrathoracic goiter, mediastinal lipoma or fibroma and neurofibroma. To narrow the diagnosis further is only speculative, but mediastinal lymphosarcoma (possibly arising in the thymus), Hodgkin's disease, malignant teratoma and carcinoma of the lung or esophagus are important possibilities. Perhaps the diagnosis is best left at mediastinal tumor, probably malignant.

enormously distended stomach containing at least a quart and a half of fresh blood and the entire bowel contained blood as well, so that he must have bled all told two or three quarts at least. We found a large ulcer which was situated at the pylorus, about one-third on the stomach side and two-thirds on the duodenal side. In the base of the ulcer a large artery stuck out very prominently and was easily proved to be the main branch of the pancreaticoduodenal artery. Evidently it was from that that he had his hemorrhage. The ulcer looked benign enough in gross but with lesions which run over onto the gastric side of the pylorus there is always room for doubt, and the next thing we found was a metastatic nodule in the liver. That set us thinking and I suggested that as a matter of routine it would be very desirable to put a number of pieces of prostate, which was done. The sections showed a benign stomach ulcer but he did have a carcinoma of the prostate and it was from that undoubtedly that the metastasis in the liver had come.

As is so often the case in these elderly people, there are apt to be half a dozen lethal diseases. He had an old infarct of the heart on the posterior wall and the circumflex branch of the left coronary artery was completely occluded. He had very severe arteriosclerosis elsewhere. There was a fairly large arteriosclerotic aneurysm of the left internal iliac artery. The apices of his lungs showed an extreme grade of emphysema with blebs up to three or four centimeters in diameter.

DR HAMPTON: What was at the left base?

DR MALLORY: Some bronchopneumonia. He also had a diverticula of the large bowel and his pericardium was completely obliterated by fibrous tissue. So that I feel sure that even if the correct diagnosis had been made immediately after his first attack, he certainly would not have survived any operative procedures.

## CASE 22462

### PRESENTATION OF CASE

A 48 year old Swedish housewife entered the Baker Memorial complaining of hoarseness and dysphagia of three or four weeks' duration.

Two years before entry the patient began to tire easily and to become weak. Six months later a physician diagnosed her condition as secondary anemia. At this time she had bilateral symmetrical numbness and tingling of the hands, as well as a raw, red tongue. One year ago she began to take iron. Under this treatment the symptoms disappeared and did not recur. Two months before entry she developed a sharp stabbing pain under the sternum. This pain was often severe enough to awaken her from a sound sleep. It persisted for about one

month and then changed into a dull ache in the midsternal region. This ache was especially marked upon swallowing and was present until admission. Five weeks before entry she developed a frequent dry hacking cough which also persisted until admission. There was only a very little sputum associated with the cough and never any blood. Three weeks before admission she suddenly became hoarse overnight and developed a sense of fullness in the throat. She had some difficulty in swallowing solids. The hoarseness and dysphagia persisted without much change in character. During the past month she had night sweats, the perspiration being more profuse around the head and neck. She had lost about eight pounds in weight during the past month.

The family and marital histories are noncontributory.

She had had the usual childhood diseases. Four years before admission she had a severe diarrhea, not associated with blood, lasting for several weeks. One year before admission she had an attack of influenza.

Physical examination showed a well developed and markedly undernourished woman who appeared chronically ill. There was slight pallor of the skin and mucous membranes. Most of the teeth had been removed. Low in the substernal notch and extending higher on the left was a firm irregular mass. Examination of the chest showed slight dullness at both apices posteriorly with some bronchovesicular breathing. The heart was negative. The blood pressure was 118/78. Examination of the abdomen showed slight tenderness in the right upper quadrant and epigastrium. The liver edge was not definitely felt, but the dullness extended three centimeters below the costal margin.

The temperature was 98°, the pulse 100. The respirations were 20.

Examination of the urine showed a specific gravity of 1.016 to 1.020 and a slight trace of albumin. The sediment showed 30 to 50 white blood cells, an occasional epithelial cell, and large numbers of bacteria. Examination of the blood showed a red cell count of 4,600,000, with a hemoglobin of 80 per cent. The white cell count was 11,000, 75 per cent polymorphonuclears. The sputum was thin, mucoid and contained numerous cocci. Three examinations for acid-fast organisms were negative. Examination of the stools was negative. The nonprotein nitrogen was 26 milligrams. A Hinton test was negative.

X-ray examination showed a mass between the esophagus, trachea, and arch of the aorta which flattened the esophagus markedly and produced multiple filling defects. This mass began just below the left sternoclavicular joint and extended downward to about the length of the manubrium to the arch of the aorta. The

# The New England Journal of Medicine

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THE BOSTON MEDICAL AND SURGICAL JOURNAL  
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## THE RENEWED INTEREST IN THE ERADICATION OF SYPHILIS

THE public, the press and the medical profession were greatly stirred recently by the refusal of a broadcasting company to allow Dr. Thomas Parran to use the word "syphilis" over the radio. Dr. Parran, Surgeon General, Public Health Service, is one of the leading advocates of the wide dissemination of knowledge of this disease throughout the country. He believes that "the conquest of syphilis may be the next step in progress against endemic pestilence." In this fight the medical profession must take an advanced position. The best weapon against disease is the prompt and persistent treatment of the acute cases.

The action of the directors of the broadcasting company has not been without benefit, however, to the best interests of the country. Many newspapers now boldly print the word "syphilis" in their headlines as well as in their news columns and have used their influence widely to spread a knowledge of the disease. Periodi-

cals such as the *Reader's Digest* have not hesitated to publish Dr. Parran's address and to arrange for the reprinting of it in pamphlet form for distribution at a very small charge. Thus it would appear that both the public and the medical profession are now awake to the importance of bringing this disease to light.

There is, however, another aspect of the problem. This deals with the terms to be used in describing this infection, especially in its primary stage. For many years the Public Health Service, both state and federal, have established departments of "venereal diseases." There is a tendency now to drop this term, which no longer applies to at least one-half of the persons affected with syphilis. It is suggested by the Massachusetts Public Health Department that a new term, "genitoinfectious diseases"\* replace the old. The reasons for this are obvious, but to many it would seem that it was only a matter of backing away from a situation which sooner or later must definitely be met. Why not use the word "syphilis" itself, the only word which adequately describes the disease? It should be pointed out, moreover, that many cases are not of "genitoinfectious" origin. Other names have gradually become standardized in the medical as well as the lay literature, "consumption" and "phthisis" have become "tuberculosis", "insanity", "mental disease", the old "pest-house", a "communicable disease hospital." The surest way to bring syphilis into the light as a disease is to use its established terminology, both in the medical profession and out of it.

Although the infectious stage of the disease is the important one to emphasize in a campaign for eradication, to the medical profession of equal importance is the treatment of the later manifestations. This treatment will be made easier when the disease is on a sound footing and the reproach connected with its venereal origin is put at a level where it rightfully belongs. Much can be done by the medical profession both to establish the proper name of the disease and to emphasize the public health aspect of its eradication.

\*Chadwick, Henry D. Genitoinfectious diseases. New Eng. J. Med. 215:594 (Nov. 5) 1937.

## MOTOR TRAFFIC ACCIDENTS AND THE DOCTOR

THE State of Massachusetts is well provided, from the point of view of medicine to care for those injured in automobile traffic accidents. We have excellent hospitals, ambulance service, and good doctors are available almost everywhere. This part of the service probably does not need to be definitely improved. On the other hand, can we do anything to avoid accidents? Are there not many people now driving automobiles in the Commonwealth who, for

## CLINICAL DIAGNOSES

Mediastinal cancer  
Pneumonia

## DR JOHN D STEWART'S DIAGNOSIS

Mediastinal tumor, probably malignant

## ANATOMIC DIAGNOSES

Epidermoid carcinoma, grade III, of the  
esophagus with metastasis to one regional  
lymph gland, producing extension into  
the trachea  
Pulmonary atelectasis  
Bronchopneumonia  
Cystitis cystica  
Operative wound Tracheotomy

## PATHOLOGIC DISCUSSION

DR TRACY B MALLORY All the physicians  
who saw this case agreed that a mediastinal  
tumor was present and felt almost equally  
certain that it was malignant. The clinical  
work-up, however, failed to develop any lead

to its primary site and, in fact, one of the reports was definitely misleading. On esophagoscopy marked narrowing of the esophagus by an apparently extrinsic mass without abnormality of the mucosa was noted. This was a perfectly correct observation but if the esophagoscopist had been able to pass his instrument 3 centimeters farther down he would have found a typical carcinoma of the esophagus with raised borders and a central ulcer. The obstruction which prevented him from reaching the tumor was due to a large lymph node 3 centimeters in diameter filled with metastatic tumor. It was this mass which apparently caused the major part of the esophageal obstruction and which certainly caused the tracheal obstruction and the involvement of the recurrent laryngeal nerve. The primary tumor itself had extended through the muscle layers of the esophagus and was adherent to the aortic arch but did not involve the trachea or bronchi. The other findings at autopsy were not particularly significant. There was extensive atelectasis of both lower lobes and several small areas of bronchopneumonia were also present.

**Barnstable**

Sunday November 22 at 4 00 p m at the Cape Cod Hospital Hyannis Subject Acute Abdominal Emergencies Instructor H M Clute John I B Vail, Chairman

**Bristol North**

Thursday November 19 at 4 00 p m at the Morton Hospital Taunton. Subject Diabetes General Plan of Treatment in *Uncomplicated* Cases Diet Insulin (Regular and Protamine) Exercise Instructor E. P Joslin Arthur R. Crandell, Chairman

**Bristol South (Fall River Section)**

Monday November 16 at 4 00 p m at the Stevens Clinic of the Union Hospital Fall River Subject The Prognosis of Heart Disease Instructor Ashton Graybiel Howard P Sawyer, Co Chairman

**Bristol South (New Bedford Section)**

Friday November 20, at 4 00 p m at St Lukes Hospital New Bedford Subject The Prognosis of Heart Disease Instructor C L Derick. Robert H Goodwin Co-Chairman

**Essex South**

Tuesday, November 17 at 4 00 p m at the Salem Hospital Salem Subject Acute Abdominal Emergencies Instructor H B Loder Walter G Phippen Chairman.

**Franklin**

Wednesday November 18 at 8 00 p m., at the Franklin County Public Hospital Greenfield Subject Neurological Surgery The Signs and Symptoms of the Common Brain Lesions—Organic and Traumatic Instructor W R Wegner Halbert G Stetson Chairman

**Hampshire**

Wednesday November 18 at 4 15 p m in the Nurses Home of the Cooley Dickinson Hospital Northampton. Subject Blood Diseases Diseases Affecting the White Blood Cells Leukemias Agranulocytosis Mononucleosis Instructor C S Keefer Robert B Brigham Chairman

**Middlesex North**

Friday November 20 at 7 00 p m at St Josephs Hospital Merrimack Street Lowell Subject The Prognosis of Heart Disease Instructor B E Hamilton Samuel A Dibbins Chairman

**Middlesex South**

Tuesday November 17, at 4 00 p m at the Cambridge Municipal Hospital, Cambridge Subject Stomach and Duodenal Ulcer Diagnosis and Treatment Instructor C W Jones Edmund H Robbins Chairman

**Norfolk**

Friday November 20 at 8 30 p m, at the Norwood Hospital Norwood Subject Blood Diseases The Hemoglobin and Red Blood Cells in Relation to Disease Instructor. G S FitzHugh Hugo B C Riemer, Chairman

**Norfolk South**

Monday November 16 at 8 30 p m, at the Quincy City Hospital, Quincy Subject Diabetes General Plan of Treatment in *Uncomplicated* Cases Diet Insulin (Regular and Protamine) Exercise Instructor Pissilla White David L Belding, Chairman

**Plymouth**

Tuesday, November 17 at 4 00 p m, at the Brockton Hospital Brockton Subject Acute Abdominal Emergencies Instructor S J G Nowak. W H Pulsifer, Chairman

**Worcester (Milford Section)**

Thursday, November 19 at 8 30 p m, in the Nurses Home of the Milford Hospital Milford Subject Blood Diseases Diseases Affecting the White Blood Cells Leukemias, Agranulocytosis Mononucleosis Instructor M B Strauss Joseph Ashkins, Sub Chairman

**Worcester North**

Friday November 20 at 4 30 p m at the Burbank Hospital Fitchburg Subject Blood Diseases The Hemoglobin and Red Blood Cells in Relation to Disease Instructor C W Heath Edward A. Adams Chairman

## MISCELLANY

### APPOINTMENTS BY GOVERNOR CURLEY

#### THE APPOINTMENT OF DR. DAVID LAWRENCE WILLIAMS

His Excellency Governor Curley has nominated Dr David Lawrence Williams of the Veterans Administration Faculty to take the place of Dr Winfred Overholser Commissioner of Mental Diseases who failed of reappointment.

Dr Williams was born in 1876 He graduated from Boston College in 1901 and from the Tufts College Medical School in 1906 According to state ments in the daily papers, Dr Williams specialized in tuberculosis until 1924 and is now chief of the laboratory service at the United States Veterans Hospital at Bedford, Massachusetts This hospital of 813 beds is for the care of nervous and mental diseases

Dr Williams is a member of the New England Psychiatric Society and was formerly a Fellow of the Massachusetts Medical Society

During the war he was a Captain in the Medical Corps and, later, a reserve surgeon in the United States Public Health Service He served in the Vet

physical or mental reasons, should not have a license? What should be the relationship between the medical profession in general, the various hospitals, and the Registrar of Motor Vehicles? If, for instance, a physician sees in private practice or at a hospital clinic a patient who has had epileptic attacks, should he assume responsibility for notifying the Registrar? Patients having petit mal attacks are probably more of a danger to the moving traffic than those who have grand mal attacks. On the other hand, if a patient, under long observation and adequate treatment for epilepsy, no longer suffers from attacks, should his license be renewable?

The same line of argument is to be considered in relation to mental disease. Are there not patients who still have mental symptoms driving on our highways? If a patient, moreover, has been an inmate of a State hospital for the insane or a private institution, ought he to have his license revoked permanently? Are there not patients who make such a good recovery that they could again be trusted to drive an automobile? In addition to patients with nervous and mental disease, there are, of course, the large group who have definite physical handicaps. Is a patient with only one eye or who has partial vision in each eye a menace as a driver of an automobile? There are many other physical handicaps, such as the loss of an arm or a leg, which need to be considered.

This is not a new problem and provisions are made by the office of the Registrar of Motor Vehicles to handle the situation if the facts in regard to the individual are known to him. There must, however, be many individuals who have defects unknown to the Registrar, who are driving on the highways. Should the medical profession take any action in this matter? Is it not a question to be seriously considered by the Massachusetts Medical Society? Many physicians who are also conscientious citizens would like authoritative advice in regard to what to do when the problem arises in their own practice.

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

WELCH, CLAUDE E. A.B., A.M., M.D. Harvard University Medical School 1932. Resident East Surgical Service, Massachusetts General Hospital. His subject is "Human Bite Infections of the Hand." Page 901. Address: Massachusetts General Hospital, Boston, Mass.

SMITH, GEORGE VAN S. A.B., M.D. Harvard University Medical School 1926. F.A.C.S. Visiting Surgeon, Pathologist and Director of Research, Free Hospital for Women and Fearing

Research Laboratory, Brookline, Mass. Research Fellow in Gynecology, Harvard University Medical School. Address: Free Hospital for Women, Brookline, Mass. Associated with him is

SMITH, O. WATKINS. A.B., Ph.D., Radcliffe 1928. Assistant in Research, Fearing Research Laboratory, Free Hospital for Women, Brookline, Mass. Address: Free Hospital for Women, Brookline, Mass. Their subject is "The Urinary Excretion of Estrogenic and Gonadotropic Hormones During Normal Menstrual Cycles, the Period of Conception and Early Pregnancy." Page 908.

ROSENBAUM, M. B.S., M.D. University of Cincinnati College of Medicine 1935. Formerly, Neurological Intern, Boston City Hospital. Now, Resident Physician in Psychiatry, McLean Hospital, Waverley, Mass. Address: McLean Hospital, Waverley, Mass. Associated with him is

HERREN, R. Y. B.A., M.A., Ph.D., M.D. State University of Iowa College of Medicine 1934. Formerly, Neurological Intern, Boston City Hospital. Now, Resident in Neurosurgery, Bellevue Hospital, New York. Address: Bellevue Hospital, New York. And

MERRITT, H. H. A.B., M.D. Johns Hopkins University School of Medicine 1926. Associate in Neurology, Harvard University Medical School. Assistant Visiting Neurologist, Boston City Hospital. Address: Boston City Hospital, Boston, Mass. Their subject is "The Cerebrospinal Fluid in Acute Alcoholism." Page 914.

FISHBEIN, MORRIS. B.S., M.D. Rush Medical College University of Chicago 1912. Editor, *Journal of the American Medical Association* and of *Hygeia, the Health Magazine*. His subjects are (1) "Medicine in the Changing Social Order" (2) "Public Relations of the Medical Profession." Pages 916 and 921. Address: 535 North Dearborn Street, Chicago, Illinois.

HAYDEN, E. PARKER. A.B., M.D. Columbia University College of Physicians and Surgeons 1919. F.A.C.S. Assistant Surgeon, Massachusetts General Hospital. Chief of the Rectal Clinic, Massachusetts General Hospital. Assistant in Surgery, Harvard University Medical School. His subject is "Progress in Diseases of the Colon and Rectum." Page 927. Address: 270 Commonwealth Avenue, Boston, Mass.

### The Massachusetts Medical Society

#### FOURTH ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning November 16



## CORRESPONDENCE

### OFFICIAL ACTIONS OF THE BOARD OF REGISTRATION IN MEDICINE

State House Boston

November 4 1936

Editor *New England Journal of Medicine*

This is to inform you that at the meeting of the Board of Registration in Medicine held October 29 1936 it was voted to restore to Dr Frank S Parsons of 367 Adams Street, Dorchester, Massachusetts his license to practice medicine which was revoked on March 10 1927

It was also voted to restore that of Dr Percy W Carr of River Street Boston, which was revoked April 26 1934

STEPHEN RUSHMORE, M.D., *Secretary*

### ANAPHYLACTIC REACTION TO SODIUM MORRHUATE

October 30 1936

Editor *New England Journal of Medicine*,

It seems that it might be worth while to report a case of anaphylactic reaction to sodium morrhuate inasmuch as this preparation is in general use now in the sclerosing of varicose veins and since many doctors are not aware of the fact that patients may have such reactions to it

Mr N, 63 years old had had sixteen previous injections of sodium morrhuate in the course of three months the doses varying from 5/10 cc to 2 cc On September 22, I injected 2½ cc distributed among three points of injection Almost immediately the skin of the leg near the sites of injection became red and itchy Within a minute the patient complained of itchiness in other parts of the body and urticarial wheals appeared in several places With in three minutes his eyes began to water and his nose began to discharge a thin secretion. He complained of obstruction of the nasal passages An asthmatic attack supervened while we were preparing adrenalin and the patient felt as if he were going to die The administration of 5/10 cc of adrenalin chloride solution 1 1000 ten minutes after the onset of the attack brought about amelioration of symptoms and in ten minutes the patient felt quite well This was the first attack that this patient had suffered He is a known hay fever sufferer

PAUL H. DUFF M.D

137 Main Street,  
Peabody, Mass

### ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

535 North Dearborn Street Chicago Ill

November 3 1936

Managing Editor

*The New England Journal of Medicine*,

In addition to the articles enumerated in our let

ter of September 28 the following have been accepted

Abbott Laboratories

Sodium Phenobarbital 1½ grains tablets

Ampules Phenobarbital Sodium 2 grains

Calco Chemical Co Inc

Tetrachlorethylene—Calco

Tetrachlorethylene—Calco 1 cc

Hixson Laboratories Inc

Diphtheria Toxoid Alum Precipitated (Refined)

International Vitamin Corporation

I V C Halibut Liver Oil Plain

Ell Lilly & Co

Parathyroid Extract—Lilly 1 cc ampule

McNeil Laboratories Inc

McNeil's Emulsion of Castor Oil

Ohio Chemical & Manufacturing Co

Ohio Carbon Tetrachloride Compound

Sharp & Dohme Inc

Wax Ampoules Silver Nitrate Solution 1 per cent

Diphtheria Antitoxin, Bovine—Mulford

E R Squibb & Sons

Thromboplastin Local—Squibb Dental Package,  
six 4 cc. vials

Wallace & Tiernan Products, Inc

Azochloramid Solution in Triacetin 1 125

Yours sincerely

PAUL NICHOLAS LEECH, *Secretary*

## RECENT DEATHS

WOODBURY—CHARLES E WOODBURY, M.D died in Roslindale October 31 1936 after a long illness He was born in Acworth New Hampshire in 1845 He was a graduate of Dartmouth College and of the New York Medical College with the class of 1874

For several years Dr Woodbury was port physician for Boston and later was a member of the staffs of McLean Bellevue Foxboro and Rhode Island State hospitals At one time he was an inspector of the Massachusetts hospitals for lunacy and charity

Dr Woodbury was a member of the Rhode Island State Medical Society and the American Medical Association.

His daughters Mrs W G Kinnear of Roslindale Mrs Charles S Ricker, and Mrs George S Sanderson survive him as does a sister Miss Nellie L Woodbury

SHANNAHAN—RICHARD JOSEPH SHANNAHAN, M.D police surgeon of Worcester Massachusetts, died at his home 839 Main Street, October 31 1936 Dr Shannahan was born in Worcester in 1879, the son of the late Richard and Margaret (Sullivan) Shannahan He was educated in the public schools of his native city and after graduating from Holy Cross in 1899 entered the College of Physicians and Surgeons of New York City graduating therefrom in 1903

erans Hospitals at Oteen, North Carolina, Rutland, Massachusetts, West Roxbury, Massachusetts, and, since 1928, at Bedford

He also served in the Division of Biological Laboratories in the State Department of Public Health as Assistant Director

#### OTHER APPOINTMENTS OF MEDICAL INTEREST

Miss Josephine Thurlow, to the Board of Registration of Nurses

Francis H Lally, Public Health Council

Arthur F Sullivan, Advisory Board, Commission for the Blind

#### MAJOR JAMES STEVENS SIMMONS TRANSFERRED TO BOSTON

Major James Stevens Simmons, Medical Corps, U S Army, who in 1934 organized the Army Medical Research Board, Ancon, C Z, and who during the past two years has been engaged in an investigation of malaria and its anopheline vectors in Panama has been transferred for duty as assistant to the Corps Area Surgeon, Boston—*Science* October 23, 1936

#### HONOR TO DR WALTER B CANNON

Dr Walter B Cannon, George Higginson professor of physiology at the Harvard Medical School, has been elected a corresponding member of the National Academy of Medicine of Buenos Aires, Argentina.—*Science*, October 23, 1936

#### THE MEDICAL CURRICULUM IN GREAT BRITAIN

It is reported in *Nature* that the British General Medical Council has adopted certain resolutions in regard to professional education. These will come into operation on January 1, 1938, and include the following

In the pre-registration requirements it is laid down that every applicant for registration as a student by the council or for admission to the medical curriculum proper should have passed (a) a recognized preliminary examination in general education as laid down in the regulations of the council and in addition (b) an examination or examinations conducted or recognized by one of the licensing bodies

The subjects to be included under (b) are

(1) One or two subjects of general education, other than chemistry, physics or biology, at a standard higher than that of the preliminary examination, for those who have received their instruction in these subjects before entering universities, university colleges or medical schools

(2) Chemistry (theoretical and practical) the elementary principles of general and physical chemistry, and of the chemical combination of elements, including carbon

(3) Physics (theoretical and practical), the ele

mentary mechanics of solids and fluids, the elements of heat, light, sound, electricity and magnetism.

The examination in biology (theoretical and practical) may be taken before or after registration as a student

About a year ago a conference of representatives nominated by the Universities of Oxford, Cambridge and London, the Royal College of Physicians of London, the Royal College of Surgeons of England and the Society of Apothecaries of London published a report on the medical curriculum which stressed the need for a continuance of the general education of intending medical students of post school certificate stage, and therefore recommended that "the Licensing Bodies consider the possibility of allowing an encouraging exemption from the first M B examination by means of a higher school certificate examination conducted by any recognized examining body in which, in addition to the three principal scientific subjects, a subsidiary nonscientific subject be taken"

The higher school certificate examination is the normal objective of the post school certificate student in public and secondary schools, and *Nature* points out that if the licensing bodies would recognize for the purpose of exemption from the second examination stated in pre registration requirements those subjects in which a student has passed a higher school certificate examination, they will impart to the higher school certificate examination a value which has been questioned in the past by intending medical students. The recognition would also lead to greater uniformity in the education of post school certificate students in the schools and would go a long way toward removing the evil of segregation of intending medical students from the rest of the school—*Science*, October 23, 1936

#### DO YOU KNOW?

The first diploma known to have been given for graduation in a course in nursing was awarded Harriet N Phillips in 1865 by the Training School for Nurses of the Woman's Hospital of Philadelphia.

Many great philosophers were first doctors. Locke, most celebrated for his work "On the Human Understanding," was a physician. William James, first of the great American philosophers, was professor of anatomy at Harvard Medical School. He died in 1910. On his desk was found this note: "There is no conclusion. There are no fortunes to be told and there is no advice to be given. Fare well."

The first doctor to receive the Congressional Medal was Frederick H Rose of the British Navy, May 11, 1858. A gold medal was awarded him for the care of yellow fever patients from Jamaica to New York on the SS *Susquehanna*—*Excerpts from the Bulletin of the New York State Medical Society*

well known men. Dr Schadt requested better attendance at the Postgraduate Course of the District Society

ANDREW PETERS M.D., *Reporter*

# SOUTH EASTERN MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH

At the meeting of the South Eastern Massachusetts Association of Boards of Health in Hyannis on Wednesday October 28 the presiding officer was Richard P MacKnight M.D. State District Health Officer

Following routine business the secretary Mr George-F Crocker Jr of Marston's Mills outlined the establishment of the new Barnstable County food laboratory which is under his direction Occupying quarters in the old county court house in Barnstable it has been outfitted and is now at work making analyses of milk and water The Cape Cod Health Bureau contributed from its reserve fund toward the equipment.

Dr H P Goff secretary of the organization last named announced that his staff had been increased by the addition of a nurse and nutritionist, Miss Katherine Leamy, who outlined the up-to-date relationships of public health and nutrition nurses and the people She plans to work not only with boards of health but with welfare agencies through them coming into direct contact with families In the school work she will not only cooperate with the regular school nurses but will help in preparing cafeteria menus for the school luncheons Another contact will be with the nursery schools whereby a considerable amount of preventive work may be accomplished In addition if it is desired help will be afforded to those among the lay organizations interested in health

The guest speaker of the afternoon was Dr B Barrett Gilman of the State Department of Public Health who discussed recent studies in connection with the control of scarlet fever with some general consideration of undulant fever His address was in terms readily understandable by nonmedical health workers In scarlet fever the speaker noted that the cause is known a streptococcus and that there is available the Dick test With reference to this there are the figures that out of 28 000 giving negative reaction only 8 developed scarlet fever while of 18 000 positives there were 356 cases

In a general view of the combat against scarlet fever Dr Gilman feels that while it is possible to a reasonable extent to determine the nonsusceptible still on the whole there are such uncertainties that it seems better to inject toxin into all children It can be used it is used today but is quite hard to have the plan accepted Few doctors make use of it and the parents are not yet favorable It is under close study and probably in about a year it may be practical to make some definite report

One matter which Dr Gilman discussed somewhat at length was that of quarantine for scarlet fever which varies in different localities for example

some places require six weeks, while others, and Barnstable County is among them have only three. Milk infection seems to be one of the prominent methods of distribution but this is very difficult to control save through pasteurization Closing the schools is deemed by health authorities to be of little avail toward prevention

Turning to undulant fever Dr Gilman said that it is not a real public health problem today It is a cattle disease noticeable in pigs and cows and coming to man through contact or by the milk of the cow The mortality is low but the effects among those who have had it are severe and lasting In 1934 there were 15 known cases in Massachusetts and in 1936 the number was 46 the rise being due to a better knowledge of its symptoms by physicians—and consequently a wider recognition of it All cases in Massachusetts have been traced to raw milk and prevention may be secured by pasteurization Meanwhile the Bureau of Animal Industry has been active in trying to interest the farmer The difficulties are that general vaccination of cattle is not practicable

At the invitation of the town authorities the January meeting of the Association will convene in Dartmouth

## NEW ENGLAND OBSTETRICAL AND GYNECOLOGICAL SOCIETY

December 2 1936 has been selected by the New England Obstetrical and Gynecological Society for its eightieth annual meeting

The headquarters will be at the University Club in Boston, Massachusetts and the program of clinics will be announced at a later date

## HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheater (Shattuck Street Entrance) Tuesday evening November 24 at 8 15 p m

### PROGRAM

#### Presentation of Cases

Studies of Renal Physiology By D D Van Slyke The Hospital of the Rockefeller Institute for Medical Research.

Professor A Baird Hastings will preside

Medical students and physicians are cordially invited to attend.

MARSHALL N FULTON M.D., *Secretary*

## NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

The three hundredth and twelfth meeting of the New England Ophthalmological Society will be held on Tuesday November 17, 1936 at 8 p m, at the Massachusetts Eye and Ear Infirmary 243 Charles Street Boston

Members of the New England Ophthalmological Society are invited to attend the clinical program morning and afternoon of the Massachusetts Eye

His internship was served at St. Vincent Hospital. Soon afterwards an appointment as junior surgeon at the New York State Hospital at Central Islip Long Island, was accepted. Subsequently he served as physician in charge of employees working on the first tunnel under East River. With the completion of this work, Dr Shannahan was appointed police surgeon for the city of Worcester serving in this position continuously until his death. During these years he was of great assistance in dealing with the prosecution of criminals in association with the District Attorney and was regarded as an outstanding practitioner in the care of emergency cases.

Dr Shannahan was a Fellow of the Massachusetts Medical Society and the American Medical Association, a member of the Knights of Columbus, the Foresters, and St Pauls Church, Worcester.

His widow, Mrs Katherine (Ryder) Shannahan, two daughters Madeline R and Virginia, and two brothers Edward A and James F Shannahan both of Worcester survive him.

**LEAHY**—DR JAMES PERCIVAL LEAHY of Cottage Street New Bedford, died at his home, October 31, 1936.

Dr Leahy was born in Taunton, Massachusetts, and, after concluding his medical studies, practiced in Brockton and Middleboro before settling in New Bedford.

He is survived by his widow, Mrs Margaret T (Kane) Leahy, a daughter, Faith Louise, two sons William M and James K Leahy, and two sisters, Mrs Alice Emery, of Allentown, Pennsylvania, and Mrs Ambrose Kennedy, of Woonsocket Rhode Island.

## NOTICES

### MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p m on Thursday November 19, in the Amphitheater of the Peter Bent Brigham Hospital Dr Robert T Monroe, Associate in Medicine, Harvard Medical School and Physician Peter Bent Brigham Hospital will give a medical clinic. To it are cordially invited practitioners and medical students.

### MASSACHUSETTS MEMORIAL HOSPITALS

There will be a luncheon meeting of the Surgical Section in the Aid Association Room, ground floor Talbot Memorial, 82 East Concord Street Boston on Friday November 13 1936 at 12 noon.

Surgical deaths during the month of September will be discussed.

MILO C GREEN M D, Secretary

### REMOVALS

CHRISTOPHER J DUNCAN M D JOHN C FAHERTY M D JOHN P TREANOR JR, M D and ROY J HEFFERNAN, M D, announce the removal of their offices

on November 1 to 1101 Beacon Street Telephone Longwood 8144

JOHN B SEARS, M D, announces the removal of his office from 475 Commonwealth Avenue Boston to 416 Marlborough Street, Boston Telephone, Kenmore 1233

## REPORTS AND NOTICES OF MEETINGS

### HAMPDEN DISTRICT MEDICAL SOCIETY

The regular Fall Meeting of the Hampden District Medical Society was held Tuesday, October 20 at the Springfield Academy of Medicine Springfield. The President, Dr P E Gear presided and about 100 members were present.

After a brief business session and reading of two or three communications and reports the Society listened to a paper by Dr John B Hawes, 2nd of Boston on the subject of "Dangerous Dusts."

According to Dr Hawes numerous medical rackets flourished by virtue of the ignorance of workmen, medical practitioners and the public, abetted by unscrupulous lawyers. Those dusts which are really potentially dangerous are practically confined to those containing silicon in some form and their effects have been proved to be of a chemical nature, the silicon combining with the body fluids after inhalation to produce a poisonous irritant which induces excessive fibrosis.

Silicates, with the exception of asbestos, are harmless. All organic dusts are practically harmless. Among the nonsilicon containing dusts is soft coal, and the mortality of soft coal miners is low except where the coal is embedded in hard rock. Slate and marble workers acquire pneumokoniosis but not silicosis. Granite and sand, both containing large amounts of silicon, are especially dangerous to workers. The size and density of the dust particles, and the duration of exposure, are important factors. It is the smaller particles which can be inhaled into the smaller air passages which are dangerous. Individual susceptibility plays a part.

In the diagnosis of silicosis the clinical history and findings are fully as important as the x-ray films. Among symptoms, dyspnea comes first later, cough sputum and weakness. Seventy to eighty per cent of silicotics die of tuberculosis there being a very direct connection.

The literature of asbestosis dates back only a few years. The condition develops rapidly and is extremely incapacitating. In these patients limitation of chest expansion is an early sign.

A very interesting set of x-ray films was demonstrated by Dr Hawes.

Following a brief discussion and questions, the speaker was given a rising vote of thanks.

Dr Knowlton then announced a meeting of the Medical Society of the Four Western Counties scheduled for November 4 at 3 p m, in Pittsfield, with clinics at two hospitals and papers by three

November 18—New England Physical Therapy Society See page 956

November 18—Massachusetts Eye and Ear Alumni Meeting clinical program morning and afternoon at the Infirmary See page 949

November 19—Medical Clinic Peter Bent Brigham Hospital See page 948

November 20—New England Roentgen Ray Society See page 950

November 24—Harvard Medical Society See page 949

November 24—Massachusetts Society for Mental Hygiene See page 803 Issue of October 22

December 2—New England Obstetrical and Gynecological Society See page 949

December 3—Annual Conference of the National Society for the Prevention of Blindness Columbus Ohio

December 11—William Harvey Society Auditorium Beth Israel Hospital Boston 8 p m

December 15—Massachusetts Eye and Ear Infirmary Monthly Clinico-Pathological Conference See page 949

March 30 April 2, 1937—First International Conference on Fever Therapy Postponement notice See page 52 issue of July 2

April 21 24 1937—American Society for Experimental Pathology See page 1075 issue of May 21

## DISTRICT MEDICAL SOCIETIES

### FRANKLIN DISTRICT MEDICAL SOCIETY

Will meet at the Weldon in Greenfield at 11 a m the second Tuesdays of January March and May

CHARLES MOLINE M.D. Secretary

Sunderland.

### MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

November 18—Bear Hill Golf Club Stoneham

January 13, 1937—Bear Hill Golf Club Stoneham

March 16, 1937—Danvers State Hospital Danvers

May 11 1937—Bear Hill Golf Club Stoneham

KENNETH L MACLACHLAN M.D. Secretary  
1 Bellevue Avenue Melrose

### NORFOLK DISTRICT MEDICAL SOCIETY

November 24—8 15 p m The Beth Israel Hospital Communications and Case Presentations by the Staff. Principal subject—Cardiology Details of program to be announced.

January 19, 1937—8 15 p m The Peter Bent Brigham Hospital. Communications and Case Presentations by the Staff. Suggested title—Abdominal Pain from the Medical and Surgical Standpoint. Details of program to be announced.

February 23 1937—Time place and details of program to be announced.

March 30 1937—8 15 p m New England Deaconess Hospital. A Symposium on Diabetes entitled A Survey of the Diabetic Work of the George F Baker Clinic in the New England Deaconess Hospital. Communications and Case Presentations by the Staff. Drs Elliott P Joslin Howard F Root Frisclilla White Alexander Marble and Allen P Joslin.

May, 1937—Annual Meeting Details to be announced.

Note The Censors will meet for the examination of candidates on the first Thursday of May 1937 Fee of \$10.00 is payable at the time of examination Application blanks may be obtained by writing the Secretary furnishing name address and name of school of graduation in medicine Application must be made at least three weeks prior to date of examination Candidates whose applications are on file will receive proper notices

FRANK S CRUICKSHANK, M.D. Secretary  
1247 Beacon Street Brookline

### PLYMOUTH DISTRICT MEDICAL SOCIETY

November 19—6 p m Goddard Hospital

January 21 1937—11 a. m. Bridgewater State Farm

March 18, 1937—11 a m Brockton Hospital.

April 15 1937—Annual Meeting 11 a m Ducey Hospital.

May 20 1937—11 a m Lakeville State Sanatorium  
FRED F WELNER, M.D. Secretary  
231 Main Street, Brockton

### SUFFOLK DISTRICT MEDICAL SOCIETY

November 18 1936—Boston Medical Library 8 15 p m Hydrocarbons and Cancer Dr M. J. Shear—U S P H Service Cancer Research. Recent Advances in Our Knowledge of Cancer Dr J C Aub Discussion Dr J W Schereschewsky U S P H Service and Dr R B Greenough.

January 27 1937—Boston Medical Library 8 15 p m Joint Meeting with the Boston Medical Library Anthropology Dr Carleton S Coon

March 31, 1937—Boston Medical Library 8 15 p m Social Insurance—It Affects the Medical Profession. Dr Charles E. Mongan. Discussion Dr Channing Frothingham.

April 23, 1937—Annual Meeting Boston Medical Library 8 15 p m Problems in Surgical Diagnosis Dr Howard M. Clute.

CONRAD WESSELHOEFT M.D. President,  
CHARLES C LUND M.D. Secretary

## WORCESTER DISTRICT MEDICAL SOCIETY

November 18. Note change of date See page 598 issue of November 5

December 9—St. Vincent Hospital Worcester, Mass. 6 15 p m Dinner—complimentary by the hospital. 7 30 p m. Business session and scientific program

January 13, 1937—Worcester City Hospital Worcester Mass. 6 15 p m. Dinner—complimentary by the hospital. 7 30 p m Business session and scientific program.

February 10, 1937—Worcester State Hospital Worcester Mass. 6 15 p m. Dinner—complimentary by the hospital. 7 30 p m. Business session and scientific program

March 10, 1937—The Memorial Hospital Worcester Mass. 6 15 p m. Dinner—complimentary by the hospital. 7 30 p m Business session and scientific program

April 14, 1937—Worcester Hahnemann Hospital Worcester Mass. 6 15 p m. Dinner—complimentary by the hospital. 7 30 p m Business session and scientific program

May 6 1937—At 4 30 in the rooms of the Worcester Medical Library Inc. at 34 Elm Street Worcester will be held the spring meeting of the Board of Censors

Wednesday Afternoon and Evening, May 12, 1937—Annual Meeting Time and place for this meeting will be announced in an early spring issue of the Journal

ERWIN C MILLER, M.D. Secretary  
27 Elm Street Worcester

## BOOKS RECEIVED FOR REVIEW

To Raise These Hairs. Fred Rothermell 350 pp  
New York Lee Furman Inc \$2.50

Dr Colwell's Daily Log for Physicians A Brief, Simple Accurate Financial Record for the Physicians Desk. Champaign Colwell Publishing Company \$6.00

Principles of Biochemistry Albert P Mathews  
512 pp Baltimore William Wood & Company \$4.50

The Legal Aspects of Milk Control James A Tobey 102 pp Chicago International Association of Milk Dealers

A Textbook of Surgery John Homans 1267 pp  
Fourth Edition. Springfield and Baltimore Charles C Thomas \$8.00

Remington's Practice of Pharmacy A Treatise Intended for the Use of Pharmacists and Physicians and as a Textbook for Students E Fullerton Cook and Charles H LaWall Eighth Edition. 2162 pp Philadelphia and London J B Lippincott Company \$10.00

Psychiatry for Practitioners Oxford Medical Publications By Various Authors Edited by Henry A Christian 646 pp New York Oxford University Press \$6.50

A Textbook of Bacteriology and Its Applications Curtis M Hilliard Revised Edition 339 pp Boston Ginn & Company \$3.50

International Health Division Annual Report, 1935 286 pp New York The Rockefeller Foundation

A Dissertation on the Sensible and Irritable Parts of Animals. Albrecht von Haller 49 pp Baltimore The Johns Hopkins Press \$1.00

Snow on Cholera John Snow 191 pp New York The Commonwealth Fund \$2.50

and Ear Alumni Meeting, Wednesday November 18, at the Infirmary

December 15, 1936 at 4 30 p m is the time chosen to resume the monthly Clinico-Pathological Conferences These conferences are to be held there after on the afternoons of the New England Ophthalmological Society meetings All members of the Society are invited to attend Dr Benjamin Sachs has temporarily assumed the responsibility for these meetings Interesting cases will be shown and pathologic material demonstrated

## PROGRAM

8 p m

'The Results of Lens Removal in High Myopia  
Dr Edwin B Dunphy  
Cataract Extraction—Colored Motion Picture Dr William P Beetham  
Paper Orthoptic Training Dr Le Grand H Hardy, New York City

## THE NEW ENGLAND ROENTGEN RAY SOCIETY

The next meeting of the New England Roentgen Ray Society will be held at the Boston Medical Library on Friday, November 20, at 8 15 p m

## PROGRAM

Tracheobronchial Tuberculosis and Atelectasis  
Dr Donald S King  
X Ray Diagnosis of Early Pulmonary Tuberculosis Dr Hugh F Hare  
Correlation Between Blood and X Ray Studies in Determining Activity of Pulmonary Tuberculosis  
Dr Lowrey F Davenport  
X Ray Problems in Surgery of Pulmonary Tuberculosis Dr Harlan F Newton  
E C Vogt, M D, Secretary  
300 Longwood Avenue, Boston Mass

## NEW ENGLAND PHYSICAL THERAPY SOCIETY

The regular meeting of the New England Physical Therapy Society will be held at the Hotel Victoria 271 Dartmouth Street, Boston, on Wednesday evening November 18 at 8 p m

The Council will meet at 6 p m A Round Table Dinner at 6 30 p m will precede the program

## PROGRAM

The Physics of Atmosphere with Respect to the Human Body

(a) Effects of Temperature (b) Effects of Moisture, (c) Effects of Pressure Leslie Lyle Campbell, Ph D, Cambridge, Mass Professor of Physics Simmons College

Treatment of Peripheral Vascular Disease with Slides Eugene E O'Neill, M D, Boston Mass Visiting Surgeon, Boston City Hospital

General Discussion

All members of the medical profession are cordially invited to attend

WILLIAM D McFEE M.D., Secretary

41 Bay State Road, Boston Mass

SOCIETY MEETINGS, CONGRESSES  
AND CONFERENCESCALENDAR OF BOSTON DISTRICT FOR THE WEEK  
BEGINNING MONDAY NOVEMBER 16 1936

Monday, November 16—

\*8 p m A Medical Historical Pageant Boston Medical Library 8 Fenway

Tuesday, November 17—

\*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Prognosis in Tuberculosis Dr Samue J King

9 30 a m Massachusetts General Hospital Thoracic Clinic—Ether Dome

\*12 m South End Medical Club Headquarters of the Boston Tuberculosis Association 554 Columbus Avenue Boston

8 p m New England Ophthalmological Society Massachusetts Eye and Ear Infirmary

Wednesday November 18—

Morning and afternoon Massachusetts Eye and Ear Alumni Meeting clinical program at the Infirmary

8 a m Massachusetts General Hospital Grand Rounds Orthopedic Department

\*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Hospital Case Presentation Dr S J Thannhauser

112 m Clinico-Pathological Conference Children's Hospital Amphitheater

4 p m - 5 p m Surgical Pathological Conference Dr Cutler and Dr Wolbach Peter Bent Brigham Hospital

\*8 p m New England Physical Therapy Society Hotel Victoria 271 Dartmouth Street, Boston

Thursday, November 19—

\*8 30 - 9 30 a m Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and the Children's Hospitals, held this week at the Peter Bent Brigham Hospital

9 a m Massachusetts General Hospital Surgical Grand Rounds—Amphitheater

\*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Social Service Case Presentation Miss E C Canterbury

9 15 a m Massachusetts General Hospital Neurological Conference—Ether Dome

12 m Massachusetts General Hospital Clinico-Pathological Conference

\*3 30 p m Medical Clinic Peter Bent Brigham Hospital Dr Robert T Monroe

Friday, November 20—

\*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Psychopathology and Society Professor Elton Mayo

10 a m Massachusetts General Hospital Fracture Rounds

8 15 p m New England Roentgen Ray Society Boston Medical Library, 8 Fenway

Saturday, November 21—

\*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Hospital Case Presentation Dr S J Thannhauser

\*10 a m - 12 m Staff Rounds at the Peter Bent Brigham Hospital Conducted by Dr Henry A Christian

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

November 12—Trudeau Society (Postponed Meeting) See page 856 issue of October 29

November 12—Pentucket Association of Physicians Hotel Bartlett 95 Main Street Haverhill at 8 30 p m

November 12—Conference of Clinical Pathology, the Boston City Hospital See page 896 issue of November 5

November 13—Massachusetts Memorial Hospitals Luncheon Meeting of Surgical Section See page 948

November 16—One hundredth anniversary of the founding of the Army Medical Library 7th Street and Independence Avenue S W Washington D C

November 16—A Medical Historical Pageant at the Boston Medical Library 8 Fenway at 8 p m

November 17—South End Medical Club 12 noon at the headquarters of the Boston Tuberculosis Association 554 Columbus Avenue, Boston

November 17—New England Ophthalmological Society See page 949

November 17 20—Southern Medical Association See page 803 issue of October 22

# The New England Journal of Medicine

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## CARDIAC PAIN AND ITS SIGNIFICANCE\*

BY JAMES ALEXANDER LYON, M.D.†

THE high death rate from heart disease revealed by recent mortality records, has fixed public attention upon the heart as a cause of death. A disproportionate amount of this publicity has fallen upon angina pectoris and coronary thrombosis, whose dramatic syndromes occasionally take the front page with the sudden death of a prominent citizen. To the patient, pain in the region of the heart has come to mean angina pectoris. More than one such patient has, upon close questioning, been found to have a very good general idea of the anginal syndrome, into which he was attempting to fit his own symptoms.

The demonstration of absolute ischemia of the heart muscle in coronary occlusion and the widespread acceptance of the theory of relative ischemia of the heart muscle in angina pectoris have focused the attention of the medical profession upon what is considered the common basis of the two conditions, namely, coronary arterial disease. When a patient in the middle or later years of life presents himself for examination complaining of heart pain, the physician, aware of the possibility of a later coronary occlusion, hesitates to rule out angina pectoris even though the symptoms are somewhat atypical, especially when the physical signs and the electrocardiogram suggest coronary disease. No doubt there has been need of a more alert and painstaking recognition of angina pectoris. My experience in recent years, however, has led me to question whether we are not becoming overcautious.

A man in the sixties came under my observation with a diagnosis of angina pectoris made six years before at which time he had been given a vial of nitroglycerin. The physical examination required a half hour during all of which time the patient complained of severe precordial pain. There was no pallor of the skin and no moisture on the forehead; his face was slightly flushed. After the completion of the examination a hypodermic tablet of nitroglycerin grains 1/100 was put under his tongue. He instantly expressed himself as relieved of pain. There was no gradual subsidence of the pain and no lapse of the required time for the drug to take effect. Over the six year period following the diagnosis of angina pectoris the patient had been taking fifteen to twenty tablets of nitroglycerine daily. This man was extremely active in his profession and

was under severe mental pressure. The diagnosis of angina pectoris had considerably augmented the strain under which he was working. This individual may possibly die of coronary occlusion—many professional men in the sixties and seventies do—but up to the present time he has not I believe had an attack of angina pectoris. Only recently this opinion was concurred in by the staff of one of our large and well known hospitals.

A young woman forty-four years of age, consulted me six months ago with a diagnosis of angina pectoris. At the time the diagnosis was made she was warned against walking up and down stairs and was advised to give up all social activities. Over a period of a year and a half during which she followed this regimen she remained unimproved. It was found when a careful history was taken that this was a very definite and precise case of a patient suffering from neurocirculatory asthenia. Under encouragement, assurance that she did not have angina pectoris and a progressive return to her former activities and mode of living she gradually returned to normal health.

The following case, quoted from an article presenting atypical cases of angina pectoris illustrates our present-day reluctance to diagnose pain in the region of the heart by any other term than angina pectoris.

A man aged sixty with arterial hypertension had as his sole complaint pain in the shoulders radiating upward into the posterior cervical region toward the occiput. Although he was somewhat short of breath on exertion and had premature ventricular beats his pain practically never occurred except early in the morning when he bent over the wash bowl to bathe his face and neck. The *anginal* nature of these discomforts was tragically demonstrated when he died suddenly one morning while bathing probably of coronary occlusion.

The assumption in this case that the pain was anginal in nature because the patient suffered sudden death ignores two facts. First, coronary occlusion may occur without angina pectoris as a forerunner and, secondly, an individual, particularly one past middle age, may have two coincident but unrelated diseased conditions. Fixing a diagnosis of angina pectoris on any pain in the region of the heart that precedes sudden death from probable coronary occlusion makes the atypical all inclusive, gives equal significance to every type of cardiac pain and confuses diagnosis.

There are three sets of diagnostic criteria inherent in the classical Heberden syndrome. One concerns the nature of the exciting cause of an attack, another is the location and quality of

Presented before the thirty seventh annual meeting of the American Therapeutic Society, Kansas City, Mo., May 9, 1936.

†Lyon, James A.—Professor of Clinical Cardiology, Georgetown University School of Medicine, Washington, D. C. For record and address of author see "This Week's Issue," page 931.

## BOOK REVIEWS

**Neurological Surgery** Loyal Davis 429 pp Phila  
delphia Lea & Febiger \$6 00

As stated in the preface, Dr Davis has written this book primarily for the practitioner of medicine that he may give his patients sound and up-to-date advice. Nevertheless, it contains much interesting material for the neurological surgeon and a great deal that will be of value to the general surgeon when he is called upon to treat a case that for one reason or another cannot be seen by a trained neurological surgeon. Many neurosurgical emergencies are cared for by the general surgeon or the general practitioner until such time as the services of a man trained in this field can be obtained. Many errors have been and are being made during the first few hours or minutes. Indiscriminate use of morphine, unwarranted x-ray examination, careless suture of wounds under general anesthesia, unwise use of the lumbar puncture needle in cases of tumor or abscess and many other pitfalls could be avoided were the facts contained in this book more generally known.

Dr Davis makes no claim that this book is a text book of neurological surgery for the surgeon practicing that specialty, but there are many points that may well be taken to heart by the specialist. There is valuable information between these covers concerning prognosis, and the reviewer only wishes that these facts had been brought together more definitely. It would be of great advantage to the practitioner could he turn to a definite section and find there the prognosis of the lesion with which he had to deal.

The book is well written, well illustrated and readable. It should have a wide circulation among progressive members of the medical profession.

**Why Bring That Up? A Guide to and from Seasickness** J F Montague 130 pp New York Home Health Library

In spite of the title of this book and the rather flamboyant style in which it is published, the volume contains much valuable advice. The author's suggestions for prevention of seasickness are worthy of notice. In addition to the usual preliminary preparations for a voyage with a day of rest, if possible, just before sailing Dr Montague advises the use of a belladonna plaster on the abdomen one grain of sodium pentobarbital an hour before going on the boat, the avoidance of your cabin for the first few hours with a walk on deck and the use of smoked glasses if the sun is bright, three grains of sodium nitrite one hour after leaving and a second capsule of sodium pentobarbital an hour later, with a third just before retiring. He strongly suggests the value of emptying the lower colon and rectum by enema on the day of departure. This procedure, he believes, will avoid many cases of seasickness. If an attack of seasickness should occur he gives the fol-

lowing directions: Start giving the patient a three grain capsule of sodium nitrite every four hours for three doses one half hour later a capsule containing one and a half grains of sodium pentobarbital to be repeated in three hours.

There is so much of interest in this book other than the actual prescriptions for prevention or treatment of seasickness that the little volume can be recommended to the medical profession. In many places it is amusingly written and the illustrations add to the pleasure of reading it.

**Mental Nursing (Simplified)** O P Napier Pearn  
Second Edition 328 pp Baltimore William Wood & Company

At the time of the publication of the first edition of this book, in 1931, it was pointed out that it was a valuable aid to nurses who specialize in the care of patients with mental disease. Its value, however, was somewhat restricted to nurses in training in Great Britain, there being many minor differences between hospital procedure in Great Britain and in the United States. The book, however, was recommended, in spite of its somewhat local character, on account of the careful way in which anatomy, physiology, hygiene and general nursing were described. In the second edition the author has added many facts and has made minor alterations and improvements in the text. The book, so useful to nurses in Great Britain, should also be of value in this country. Not a few physicians, moreover, by reading it could add to their stock of knowledge.

**Symptoms and Signs in Clinical Medicine** E. Noble Chamberlain. With a chapter on the Examination of Sick Children by Norman B Capon 424 pp Baltimore William Wood & Company \$8 00

This volume by an English author, with a special chapter on the examination of sick children, offers no departure from the usual treatise on physical diagnosis. Neither in arrangement, illustrations nor subject matter does it replace other small volumes on this subject. There are a number of illustrations in color which to the mind of the reviewer are anything but an addition, since the color reproduction is so poor. The format and diction are excellent and the usual diagrams are clear and instructive.

**Section of Primate Physiology, Laboratory of Physiology, Yale University School of Medicine**  
Collected Papers July 1 1935 June 30 1936, Vol  
ume III New Haven Connecticut

The previous volumes of the Collected Papers of the Yale Laboratory of Physiology have already been noticed. This volume contains thirty more papers published in 1935 and 1936. The high standard set by this laboratory has previously been commented upon and the convenient form in which these reprints are gathered together with a table of contents, will be appreciated by physiologic laboratories throughout the world.



shows some pallor of the skin and moisture on the forehead. This appears in rather striking contrast to the flushed appearance of the skin when a patient is experiencing the sharp, stabbing precordial pain associated with aortic disease, and patients have repeatedly told me that they have no feeling of apprehension during their attacks even when the pain is very severe and prolonged. On the other hand when the pain of angina pectoris is intense the patient is likely to express some degree of apprehension. Mild gastrointestinal symptoms occasionally appear during an anginal seizure, and not a few anginal patients have been treated for indigestion. It may be noted in passing that severe gastrointestinal symptoms are sometimes observed in cases of coronary occlusion and that their appearance at the onset of an attack has at times been responsible for surgical interference. The reverse is also true for gastrointestinal upsets with referred pain in the chest have been diagnosed angina pectoris or coronary occlusion.

The subsidence of anginal pain is gradual, the intensity receding slowly when the patient comes to a standstill and more rapidly when amyl nitrite or nitroglycerin is administered. When the pain disappears the patient feels normal. There are no "hangover" symptoms, with the single exception of some slight degree of nervous

exhaustion in occasional patients. No sensitiveness or tenderness to pressure is felt over the chest, as in cases of neurocirculatory asthenia and cardiac neurosis.

These personal observations on the nature of the exciting cause of an attack of angina pectoris, the location and quality of the pain and the manner and conditions under which the pain subsides have brought up for consideration only a few of the conditions that may give rise to cardiac pain. Any condition, such as aortic aneurysm, mediastinal growth or diaphragmatic pleurisy, that causes a direct stimulation of the sensory nerve endings in the thoracic wall may induce pain simulating angina pectoris. So also may certain other conditions of the chest, such as tumors, fibrotic or inflammatory lesions, herpes zoster, tabetic crises and bursitis.

During the past year, 80 per cent of the patients who presented themselves for examination in my private practice complained of cardiac pain. A few had angina pectoris, many more did not. The significance of cardiac pain can be rightly evaluated in the majority of cases only by a close, painstaking questioning of the patient designed to differentiate sharply the various types of pain.

#### REFERENCE

1. Laplace, L. B. The relationship of angina pectoris to aortic valvular disease. *Am Heart J* 8:110 (Aug) 1933.

## A SCHEME FOR THE TREATMENT OF DIABETES MELLITUS WITH HIGH CARBOHYDRATE-LOW FAT DIETS\*

BY JOHN M. FLYNN, M.D.†

IT is admitted by all authorities that diabetics like nondiabetics require proteins, carbohydrates, fats, salts, water and vitamins for carrying on the normal metabolic processes of the body. There is, however, no unanimity of opinion as to the optimum mixture of carbohydrate, protein and fat to be prescribed for meeting part of this requirement. One school (Poige and Adlersberg,<sup>1</sup> Sansum, Blatherwick and Bowden,<sup>2</sup> Gevelin,<sup>3</sup> and Rabinowitch<sup>4</sup>) favors a high carbohydrate-low fat diet, the other (Newburgh and Marsh,<sup>5</sup> and Petien<sup>6</sup>) the reverse. The adherents of these opposing schools have endeavored to justify their positions by citing the beneficial results accruing to patients treated by the type of diet they espouse. In

the outpatient clinic of the Peter Bent Brigham Hospital we have adhered to the regime of the high carbohydrate-low fat school, not only because of the theoretical considerations brought forth by its adherents, but also because we have found it a practical impossibility to feed high fat-low carbohydrate diets to our ambulatory patients over a long period of time. Patients fed the latter diets tended almost invariably to modify them by increasing the carbohydrate, by decreasing the fat or by doing both. The present paper is written for the purpose of explaining the simplified scheme we have adopted for the calculation of these diets in our outpatient clinic.

Before discussing our dietary scheme it is necessary to say something about the criteria employed to determine the adequacy or inadequacy of a diet prescribed in this disease. These criteria may be obtained from many sources

\*From the Medical Clinic of the Peter Bent Brigham Hospital.

†Flynn, John M.—Junior Associate in Medicine, Peter Bent Brigham Hospital. For record and address of author see *This Week's Issue*, page 991.

the pain, a third is the manner and the conditions under which the pain subsides.

When the syndrome follows the classical pattern, the attack is precipitated by a fairly constant amount of exertion or emotional excitement, although the amount necessary to induce pain may gradually lessen over a period of time and may be less following the ingestion of food. If a patient complains of having an attack of heart pain whenever he exerts himself in such a way as to involve a particular movement of the head, shoulders or spine and is free of attacks when undergoing other kinds of exertion requiring the same degree of effort, he very probably does not have angina pectoris. There is a possibility that careful roentgenologic studies in such a case would show spondylitis of the upper dorsal or cervical regions which in certain movements irritates the nerve roots directly. Or, careful questioning might elicit the presence of some of the more common symptoms of arthritis or of focal infection so that cervical arthritis or hypertrophic arthritis of the spine might be suspected.

In typical angina pectoris, the pain centers in the substernal region. This location was found by the German clinicians to be so invariable in angina pectoris that they designated it *substernitis*. My own experience supports the German view, and I cannot recall having seen a case of precordial pain that was diagnosed angina pectoris in which the diagnosis was not open to question on other grounds as well. There are several conditions which give rise to various types of precordial pain, but since there is a difference of opinion as to whether we can admit precordial pain into the anginal syndrome, it would seem more exact to discuss the types of precordial pain on the basis of their characteristics rather than of their location.

The pain of angina pectoris is paroxysmal with a gradual rise in intensity and a gradual subsidence. The duration of an attack is usually from three to fifteen minutes. In very mild or beginning cases the pain may be severe for only a matter of seconds. In long-continued cases or cases of anginal failure it may be intense for thirty minutes and occasional for an hour or more. When a patient is suffering prolonged attacks of pain, angina pectoris must be sharply differentiated from coronary occlusion and the patient must be watched for the possible appearance of a fall in blood pressure, an elevation of temperature, a leucocytosis and a friction rub, indicative of myocardial infarction.

A burning, boring, constricting or crunching pain is characteristic of angina pectoris, rarely if ever, is it a sharp, knifelike or a dull aching sensation. My experience would indi-

cate that intermittent, sharp, stabbing precordial pain is frequently associated with aortic valvular disease. The literature shows a divergence of opinion on this point. Laplace,<sup>1</sup> however, noted that 82 per cent of the patients in a group of seventy-two cases of aortic valvular disease complained of this sharp, stabbing type of precordial pain. A patient may suffer from both the precordial pain of aortic disease and the substernal pain of angina pectoris, but a carefully taken history and close questioning will prevent a confusion of the two types. The short, sharp pain associated with extrasystoles is differentiated from anginal pain both by its sudden intensity and by its having no constant relation to exertion. An intense, sharp but continuous precordial pain is at times associated with paroxysmal auricular tachycardia of very rapid rate. When its duration is brief, it may simulate the pain of angina pectoris and, when its duration is prolonged, the pain of coronary occlusion. I have now under my care a woman, thirty-seven years of age, who recently had such an attack lasting four hours and not subsiding until the tachycardia ceased. The heart rate during the paroxysm was between 190 and 230 beats per minute. A sharp, fleeting precordial pain is sometimes complained of in acute rheumatic heart disease. In pericarditis there may be a sharp, stabbing pain, especially on inspiration, or a continuous severe ache, if extra-pericardial tissues are involved. Pulmonary embolism not infrequently gives rise to intense, continuous precordial pain simulating that of coronary occlusion. A dull, heavy precordial ache is at times associated with hypertension, valvular disease, enlarged and failing hearts, cardiac neuroses and neurocirculatory asthenia.

The pain of angina pectoris characteristically radiates into the left shoulder and down the left arm into the little finger. Occasionally it radiates into both shoulders and rarely into the right shoulder only, into the neck or under the left scapula. At times there is no radiation. In mild or beginning cases the pain in rare instances may be confined to the area of radiation and be absent in the substernal region. In such a case the possibility of arthritis or neuritis must be considered. There are cases of undoubted angina pectoris with radiation in which the patient, during the time elapsing between seizures, experiences dull aching or burning pain in the area of radiation. It is not unlikely that we are dealing in these cases with two distinct conditions, rather than two phases of one condition. The pain of arthritis or neuritis caused by a latent focus of infection may well be localized in an area highly sensitized by the radiated pain of angina pectoris. Such a condition existed in a patient under my observation.

A patient in an anginal seizure generally

fat intake is kept at the irreducible minimum demanded by palatability and by the necessity of feeding fat whenever prescribing protein. It is only when the carbohydrate tolerance has reached high levels, for example, G240, that we allow fat in the form of cream, bacon or mayonnaise. Since butter consumption runs along parallel to that of bread and vegetables, this does not prove too difficult.

The use of this method can be understood more readily by giving an example. Thus we often prescribe a diet of G150 on the initial visit. This is divided into three equal parts of G50, of which one will be eaten at each meal. In this case one might prescribe

## BREAKFAST

	Serv- ings	G	
Egg	1	4	(for protein content)
Fruit No. 1	1	10	
Cereal No. 2	1	13	
$\frac{1}{2}$ glass Milk	1	9	(needed with cereal for
Uneedas	2	10	fat and so forth)
Tsp. Butter	1	1	(for egg Uneedas and so
			forth)
Total		47	(Although it was desired
			to prescribe G50 for
			the meal in practice
			one may take a latitude
			of G3 above or below
			this. Thus in the
			case of a diet of G50
			one may prescribe a
			diet of between G47
			and G53)

## DINNER

	Serv- ings	G	
Meat or Fish No. 3	1	12	(for protein content)
Vegetables No. 5	2	12	
Fruit No. 1	1	10	
Uneedas	3	15	
Tsp. Butter	1	1	(for Uneedas vegetables
			and so forth)
Total		50	

## SUPPER

	Serv- ings	G	
1 glass Milk	1	17	(for protein content)
Vegetables No. 5	2	12	
Fruit No. 1	1	10	
Uneedas	2	10	
Tsp. Butter	1	1	(for Uneedas vegetables
			and so forth)
Total		50	
Total for day		147	

Commencing with a diet such as this as a basis, the patient's clinical response will determine the direction in which it should be altered and whether or not insulin should be employed as an adjunct to dietary therapy. If the weight decreases below the optimum, one would feel that the diet should be increased. If the weight increases above the optimum or if glycosuria of moderate or severe grade continues, one would

feel that the diet should be decreased or that insulin should be employed.

A few self explanatory notes may be added.

(1) The helping of cereal given in our chart is about one half that which is conventionally eaten at breakfast. As tolerance increases, 2 helpings of cereal, equal to the conventional serving, are prescribed.

(2) Uneedas are useful for adjusting the G value of a diet. They have an equivalent value to other articles of food given in the list. Thus 2 Uneedas = one helping fruit = one half slice bread. 4 Uneedas = one slice bread = one 3 oz. potato.

(3) The conventional serving of meat or fish weighs approximately 3 ounces.

(4) A medium sized potato weighs approximately 3 ounces.

(5) Every sub maintenance diet is a high fat diet because the patient supplements his food intake by drawing on the fat depots of his body for maintenance. Hence a sub-maintenance diet may be a low carbohydrate-high fat diet. According to the school we follow, this results in a lower carbohydrate tolerance than a diet of the opposite type. In confirmation of this we have observed numerous patients who showed glycosuria on a sub-maintenance diet of G150 but who became sugar free on a diet of G240.

(6) Mid morning glycosuria may at times be abolished by giving the breakfast fruit in the middle of the morning. The rationale of this seems to lie in the fact that when one ingests an easily assimilable form of carbohydrate while in the fasting condition absorption may take place so rapidly that the limits of carbohydrate tolerance, unless these are very high will be exceeded, thereby leading to hyperglycemia and glycosuria. In this connection we have studied the effect on glucose tolerance of equivalent values of glucose and of Uneedas and have found that the tolerance of the former is much greater than that of the latter. This difference is probably due to variations in the rate of absorption.

(7) Graduated exercise enhances carbohydrate tolerance particularly in middle-aged diabetics with a low blood pressure.

## SUMMARY

This paper is written for the purpose of presenting a simplified scheme for the calculation of diabetic diets of the high carbohydrate-low fat type. Our adherence to this school is motivated not only by the theoretical considerations brought forth by its members but also because it is a practical impossibility to feed any other type of diet to our patients.

The criteria for judging the adequacy or inadequacy of any diabetic diet are discussed, and emphasis is laid upon the use of the simpler criteria in appraising the condition of patients. Among the more valuable criteria are the general physical examination, especially the study of dehydration, the body weight and the simple qualitative test for glycosuria. The study of

Among the more important of them are the following the patient's feeling of well-being, his general physical condition, the presence or absence of dehydration, the body weight, the specific gravity of the urine, the twenty-four hour output of urine, glycosuria, ketonuria and blood sugar level

The simpler criteria of effective treatment are probably overlooked all too frequently in the present era of highly developed laboratory technique. Nevertheless, in our experience with ambulatory cases, it would seem that the patient's feeling of well-being, the study of his general condition by the ordinary office methods and a determination of his body weight yield far more information of interpretable value than many of the laboratory tests employed today. In this connection it seems well to remark that we do not decri laboratory methods of investigating disease but feel that a definite distinction should be drawn between laboratory tests that furnish information of clinical value in the management of patients and those that are chiefly of value in the investigation of disease.

The general physical examination needs no argument to justify its performance in every case of diabetes mellitus. In performing it, it is particularly important to study evidences of dehydration for, as will be shown below, there are many who believe that dehydration is the cause of many of the sequelae of diabetes. The body weight is probably our best quantitative method of determining an individual's nutritional state. As a general rule the optimum weight for a diabetic is one slightly below that termed "ideal" for a normal individual of the same height, age and sex.

The qualitative test for glycosuria, when interpreted in conjunction with other data, is probably our most valuable criterion as to the effectiveness of treatment. Indeed there are many who feel that glycosuria of itself alone entails the series of events that proves so harmful to diabetic patients—glycosuria, polyuria, dehydration, desiccation of the tissues, undernutrition and so forth (Mosenthal,<sup>8</sup> Chang Harrop and Schaub,<sup>9</sup> Lande,<sup>10</sup> Atchley, Loeb, Dickinson, Benedict and Driscoll,<sup>11</sup> Himwich, Fazikas, Nahum, DuBois, Greenburg and Gilman,<sup>12</sup> Peters, Kydd and Eisenman<sup>13</sup>). In interpreting glycosuria one must always realize that the presence of glucose in a particular specimen of urine does not necessarily indicate that glucose is present in the urine excreted by the kidney at the moment the specimen is passed, but rather that glucose has been excreted by the kidney since the time of the previous urination. One must also distinguish the transient glycosuria of mild degree unaccompanied by polyuria, thirst, dehydration, undernutrition and so forth from the more persistent glycosuria

of moderate or severe degree accompanied by the same symptoms. We have generally found it wisest to ignore the former, although we always combat the latter by altering the diet, by exhibiting insulin or by doing both.

Determinations of the blood sugar level seem to us to give information of less practical value in the management of ambulatory patients. While there are some who feel that the blood sugar level should be determined frequently and that every effort should be made to keep this within so called normal limits, this has seemed to us theoretically unnecessary and practically impossible in cases of this type. Indeed there are those who feel that a high blood sugar when unaccompanied by glycosuria of severe degree is not only not harmful but may even be beneficial (Mosenthal<sup>8</sup>). In ambulatory cases we determine the blood sugar for the purpose of confirming the diagnosis and in cases of arteriosclerosis that are receiving insulin and in which an insulin reaction might be attended by serious consequences.

In view of the foregoing considerations it has been our endeavor to prescribe diets that would subserve the following ends: (1) to maintain the body weight at the optimum level; (2) to avoid glycosuria of such degree as to bring about clinical dehydration, and (3) to secure the patient's feeling of well-being. Wherever the patient does not tolerate a diet that maintains his body weight at the optimum level while he performs the ordinary tasks of life without developing glycosuria of such a degree as to lead to dehydration, insulin is employed as an adjunct to dietary therapy.

Two sheets are used in our scheme for calculating diabetic diets. Sheet 1 is the office record. It contains a list of the various articles of food to be prescribed together with food values for helpings of arbitrary size. These helpings are described in terms of common household measuring utensils on sheet 2. The calculation of the diet is done in the last column on sheet 1 and then the article of food, the number of helpings and any reference to the notes on the second sheet are copied on to the latter. In calculating the diet, the actual carbohydrate, protein, fat and caloric values given on sheet 1 are ignored. Attention is focused chiefly on the glucose equivalent of the different articles of food, determined by the use of Wood-yatt's formula,<sup>14</sup>  $G = C + 58P + 10F$ . An effort is made to give an adequate protein intake and to keep the fat intake as low as possible. To do this the patient is given at least one egg, one moderate helping of meat or fish and one glass of milk, containing approximately 35 grams of protein. Since this is supplemented by the protein contained in bread, in cereals and in vegetables, most of our patients receive between 55 and 75 grams of protein per day. The



the blood sugar level is considered to be of value only as a diagnostic procedure and as a method of forestalling insulin reactions in arteriosclerotic patients, in whom reactions might prove dangerous

In our diets the actual carbohydrate protein, fat and caloric values of the foods prescribed are ignored and attention is focused chiefly upon the glucose equivalent, as deter-

mined by Woodyatt's formula. Most of our diets are relatively low in protein, although there is some increase parallel to that of carbohydrate owing to the fact that bread and vegetables contain a small amount of protein. Fat is kept down to the limit demanded by palatability, except where the glucose tolerance is relatively high.

## SHEET 1 OFFICE RECORD

## DIABETIC DIET SHEET

Name \_\_\_\_\_ Date \_\_\_\_\_

Diet Order    Carb    Pro    Fat    Calories    Glucose

*For Day*

C	P	F	Cal		G	G
4	4	48	464	½ cup Heavy Cream	12	
4	4	24	248	½ cup Light Cream	8	

*Breakfast*

C	P	F	Cal		G	G
0	6	6	78	Egg	4	
10	0	0	40	*Fruit No 1	10	
12	2	0	56	*Cereal No 2	13	
6	4	4	76	½ glass Milk	9	
5	1	1	26	Uneda	5	
18	3	0	84	1 slice Bread	20	
0	0	3	27	Tsp Butter	1	
0	5	15	155	Bacon	5	

*Dinner*

C	P	F	Cal		G	G
0	21	9	165	Meat or Fish—3 oz. No 3	12	
0	28	12	220	Meat or Fish—4 oz. No 3	17	
4	2	0	24	*Vegetables No 5	6	
18	3	0	84	Potato—3 oz. No 4	20	
24	4	0	112	Potato—4 oz. No 4	26	
10	0	0	40	*Fruit No 1	10	
5	1	1	26	Uneda	5	
18	3	0	84	1 slice Bread	20	
0	0	3	27	Tsp Butter	1	
12	8	8	152	1 glass Milk	17	

*Supper*

C	P	F	Cal		G	G
12	8	8	152	1 glass Milk	17	
0	21	9	165	Meat or Fish—3 oz. No 3	13	
0	6	6	78	Egg	4	
4	2	0	24	*Vegetables No 5	6	
18	3	0	84	Potato—3 oz. No 4	20	
10	0	0	40	*Fruit No 1	10	
5	1	1	26	Uneda	5	
18	3	0	84	1 slice Bread	21	
0	0	3	27	Tsp Butter	1	
0	0	15	135	Mayonnaise	2	

\*The size of individual helpings is given on sheet .

offer less resistance to invasion by the tubercle bacillus than do boys

From the statistics of tables 1 and 2 we observe that a successful collapse is most often obtained when the disease is in the minimal stage, both for boys and girls. Collapse was

TABLE 1

## GIRLS

	Number	Successful Collapse
Minimal	14	11 — 78%
Mod Advan	20	15 — 75%
Far Advan	29	11 — 38%
Total	63	37 — 59%

TABLE 2

## BOYS

	Number	Successful Collapse
Minimal	14	11 — 78%
Mod Advan	15	9 — 60%
Far Advan	5	3 — 60%
Total	34	23 — 68%

considered successful when the conditions outlined by the Committee on Artificial Pneumothorax of the American Sanatorium Association<sup>2</sup> were met, namely

- 1 Disappearance of symptoms
- 2 Disappearance of bacilli from the sputum
- 3 Demonstrable closure of cavities

TABLE 3

## GIRLS

	Successful Collapse	Favorable Prognosis
Minimal	11	10 — 90%
Mod Advan	15	9 — 60%
Far Advan	11	3 — 27%
Total	37	22 — 59%

TABLE 4

## BOYS

	Successful Collapse	Favorable Prognosis
Minimal	11	11 — 100%
Mod Advan	9	7 — 77%
Far Advan	3	1 — 33%
Total	23	19 — 83%

In tables 3 and 4 the cases in which successful collapse was obtained are considered with regard to the prognosis. It is readily seen that as the disease reaches the advanced stage the prognosis becomes much more grave, even when

collapse is successful. From these tables we also see that a favorable prognosis is encountered slightly more frequently in the male group than in the female group.

TABLE 5

## GIRLS

## Routine Sanatorium Treatment

	Number	Favorable Prognosis
Minimal	14	10 — 71%
Mod Advan	20	5 — 25%
Far Advan	29	1 — 3%
Total	63	16 — 25%

TABLE 6

## BOYS

## Routine Sanatorium Treatment

	Number	Favorable Prognosis
Minimal	14	8 — 58%
Mod Advan	15	8 — 53%
Far Advan	5	1 — 20%
Total	34	17 — 50%

Considering now the control groups we see in tables 5 and 6 that the prognosis for boys and girls receiving only routine sanatorium treatment is much less favorable than the prognosis for similar groups receiving collapse therapy. It is seen that only 25 per cent of the girls receiving routine sanatorium care may be considered to have a favorable prognosis as compared with 59 per cent of the girls receiving collapse therapy and 50 per cent of the boys without pneumothorax as compared with 83 per cent of the boys with pneumothorax. We again see that the prognosis for boys is more favorable than for girls.

In tables 7 and 8 the combined statistics for boys and girls with successful collapse are compared with the combined statistics for boys and girls receiving only routine sanatorium treatment. It is apparent that successful artificial pneumothorax will increase the incidence of favorable prognosis in each stage of the disease. The percentage of cases with successful collapse in which a favorable prognosis is predicted is exactly double the percentage of cases without collapse.

In all of our cases in which we have been able to induce some degree of collapse of the diseased lung we have noted clinical improvement, as evidenced by lessened symptoms of toxicity, lowered temperature, diminished sputum or some improvement in the patient's general condition which we believe has prolonged life even if a favorable prognosis could not

## ARTIFICIAL PNEUMOTHORAX IN ADOLESCENTS

BY RUFUS R LITTLE, M D \*

THE results of treatment of pulmonary tuberculosis in the adolescent boy and girl have given rise to the impression that the disease in this age group must be viewed with a great deal of pessimism. It is true that statistics show a higher mortality among young girls and boys than among older individuals. However articles have been recently published tending to show that artificial pneumothorax will give results in this age group that compare favorably with the results of treatment in older individuals. Brock and Mullen<sup>1</sup> concluded from an investigation of the treatment of patients between 12 and 21 years of age that artificial pneumothorax is by far the method of choice in this age group and, further, that the results of proper treatment show that young women in their 'teens obtain just as good results as do young men in their 'teens and that results of treatment are just as good as they are in older individuals.

The Committee on Artificial Pneumothorax of the American Sanatorium Association has recently made a survey of artificial pneumothorax in representative American tuberculosis sanatoria.<sup>2</sup> Quoting from the conclusions of the committee, "The age of the patient does not, as far as these data show, exert an important influence on the success or failure of pneumothorax therapy. Although the number of cases in the lowest age-group is few, they furnish no substantial support for the common impression that patients under twenty respond poorly. These rather limited data suggest a wider use of therapeutic pneumothorax in the group under twenty, following the indications commonly employed in older patients."

In this present study of the effect of artificial pneumothorax in the treatment of tuberculosis of adolescence, we have assembled a group of 97 cases for consideration. These cases are by no means selected, but simply comprise the first 97 patients treated by pneumothorax in this institution, on whom follow-up notes could be obtained. The end-results of this group cannot as yet be absolutely determined since the great ma-

jority of these patients are still receiving collapse therapy. However, in treating these patients we have formed certain definite impressions concerning the effectiveness of this form of therapy. These impressions must of necessity be based upon the clinical condition of the patients as determined by temperature, sputum weight, blood count and blood sedimentation rate. We are well aware that the clinical appearance of a patient suffering from tuberculosis is often misleading, yet we feel that the course of the disease can be followed with a fair degree of accuracy by very careful observation of the above factors, especially since the collapsed lung makes the x-ray of little value.

As a control group, we have assembled 97 unselected cases receiving routine sanatorium treatment, this group being comprised of the same number of minimal, moderately advanced and far advanced cases as the group in which pneumothorax was attempted.

With very few exceptions the ages of the patients considered in this study ranged between 11 and 16 years, no case being over 16 years on admission. Of the entire group only 4 patients were colored, hence the factor of race cannot be considered.

In the accompanying tables we have grouped the cases first according to sex, then according to classification upon admission, based of course upon the extent of pulmonary involvement. In reviewing these cases we have attempted to correlate the stage of the disease with the possibility of inducing effective pneumothorax and with the prognosis.

Many of these patients have had pneumolyses and in one or two cases there was temporary phrenic nerve paralysis. These procedures were carried out only to increase the effectiveness of the collapse, and their effect on the course of the disease cannot be isolated. Those cases in which thoracoplasty was performed are not included in this study.

Considering first the group in which artificial pneumothorax was attempted we find that there were 63 girls and 34 boys, a ratio of practically 2 to 1. This is in itself a significant fact, for it cannot be doubted that girls in this age group

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holm, about \$150) The latter is written in English and has some excellent lithographs Numerous articles have also been published, some of a general nature and some relating to special investigations Most of the articles, for example those by Young and Osgood, Reich, and Rohr, have been based on simple puncture of the sternum with a hollow needle followed by aspiration of material with a syringe It should be remembered that although these puncture methods are simple, they are of only limited value since they fail to give an idea of the general topography of the bone-marrow The material obtained is a mixture of blood, fatty and cellular marrow With the use of Seyfaith's original technic which the reviewer has practiced in about 150 cases (W Dameshek *Am J M Sc* 190 617 [Nov] 1935), a plug of bone (and marrow) is obtained which can be utilized for making sections and "touch" preparations The resultant cavity can then be curetted and smear preparations made on slides These are best for studying individual cellular detail, the sections are unsurpassed for study of topography The smears may at times be misleading, and so may the sections, a combination of the two types of preparations is far better than either alone The reviewer has found the chief use of the marrow biopsy in the diagnosis of certain cases of chronic anemia and of leukopenia in which the etiology is not readily discernible Many of these cases have turned out to be examples of aleukemic leukosis It is frequently impossible to state from a given blood picture, presenting anemia, leukopenia, and thrombocytopenia whether the bone-marrow is "full" (hyperplastic) or "empty" (hypoplastic) In the presence of an arrested maturation, a "full" marrow may be associated with an "empty" blood The marrow biopsy in these cases is usually helpful Even with the best of preparations it is sometimes difficult to make a correct interpretation, with puncture preparations in which a small number of marrow cells diluted with a good deal of blood are aspirated, interpretation becomes even harder If the procedure of sternal biopsy is once considered, it seems to the reviewer that the technic should be as good as one can possibly attain

With regard to the circulation within the marrow, it is a moot question whether the blood passes through closed capillaries or through sinusoids situated between the parenchymal cells, although most authors are agreed that the circulation is a closed one W Gohs (*Arch f path Anat* 294 103, 1934), on the basis of experimental observations in chickens criticizes Doan's conception of "intersinusoidal capillaries" He concludes that the bone marrow contains two types of capillaries, that is, venous and arterial The venous capillaries he

finds are in direct communication with the venous system of the bone-marrow and within them blood formation goes on The entire system, Gohs concludes, is a completely closed one

#### METHODS

**Anticoagulants** The subject of anticoagulants is becoming increasingly important because of the rapidly growing use of the hematocrit and the sedimentation rate T B Magath and Margaret Hurn (*Am J Clin Path* 5 548 [Nov] 1935) analyze the various anticoagulants which have been used and conclude that heparin produces no swelling, crenation, or laking, that dry oxalate causes much shrinkage of erythrocytes necessitating multiplication of the hematocrit value obtained by 1.127, that sodium oxalate in 1.1 per cent solution is suitable and causes no significant swelling or shrinkage V G Heller and H Paul (*J Lab & Clin Med* 19 777, 1933-34) get around the shrinkage caused by sodium or potassium oxalate by using a mixture of sodium oxalate with ammonium oxalate If a standard amount is used for say 5 cc of blood, neither shrinkage nor swelling takes place and no correction factor is necessary M M Wintrobe and J W Landsberg (*Am J M Sc* 189 102 [Jan] 1935) conclude from their investigations that the above mixture of the two types of oxalate is as effective and accurate, in their determinations, as the extremely expensive heparin

E M Greisheimer, Agnes Hodapp, and Edith Goldsworthy (*Am J M Sc* 190 775 [Dec] 1935) found that sodium citrate is a highly satisfactory anticoagulant (0.5 cc of a 3 per cent solution for 4.5 cc of blood) They come to the rather startling conclusion that heparin, often considered the standard anticoagulant, increases the sedimentation rate in all cases

**Sedimentation Rate** In the above mentioned article, Wintrobe and Landsberg carry out an exhaustive investigation of the sedimentation rate in which such factors as anticoagulant, bore, length, and inclination of the tube, temperature, concentration of the red blood cells are analyzed These authors, like Rourke and Einstene working with heparin, found that it was necessary to correct the sedimentation rate for the hematocrit reading, which can conveniently be done in the Wintrobe hematocrit tube They state it is not essential to make readings every few minutes, by using a correction chart, the reading at the end of an hour may be taken

It is readily conceded that the sedimentation rate is a relatively "gross" nonspecific test reacting sometimes unpredictably to many conditions It seems justifiable therefore, except in research investigation, to use (1) a relatively inexact measure, say at the end of an hour,

TABLE 7  
BOYS AND GIRLS  
With Successful Collapse

	Number	Favorable Prognosis
Minimal	22	21 — 95%
Mod Advan.	24	16 — 67%
Far Advan	14	4 — 28%
Total	60	41 — 68%

TABLE 8  
BOYS AND GIRLS  
Receiving Routine Sanatorium Treatment

	Number	Favorable Prognosis
Minimal	28	18 — 64%
Mod Advan	35	13 — 37%
Far Advan	34	2 — 6%
Total	97	33 — 34%

be predicted In no instance do we feel that pneumothorax has resulted in an acceleration of the disease process

#### CONCLUSIONS

Although we realize that the figures presented are not conclusive, yet we feel that they are

definitely indicative of the value of artificial pneumothorax in adolescents Our results are similar, in most respects, to those published by others We have been able to arrive at certain conclusions from this study

1 Sex is an important factor, the female adolescent responding less favorably to collapse therapy than the male adolescent In this we differ from the conclusions of Brock and Mullen, referred to above

2 The amount of disease with which an individual is admitted to the sanatorium is the most important factor influencing the prognosis of both sexes, even with effective pneumothorax

3 Artificial pneumothorax therapy is the method of choice in adolescents

4 In our series 68 per cent of the patients with effective pneumothorax are at present considered as having a favorable prognosis, while only 34 per cent of a control group of patients of the same age group receiving only routine sanatorium care are classed as having a favorable prognosis

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## MEDICAL PROGRESS

### PROGRESS IN HEMATOLOGY\*

Late 1934 and 1935

BY WILLIAM DAMESHEK, M D †

#### INTRODUCTION

**A**DVANCE in hematology continues unabated The intimate association of the blood cells with almost every conceivable type of bodily disorder is becoming increasingly apparent, making the study of the morphology of the blood in a given case almost imperative As pointed out in last year's review, hematology has gone a far way from the mere study of the morphology of the blood cells, being now concerned with most of the organs of the body Thus, a problem in vascular disease of the extremities may resolve itself into a case of polycythemia vera, the occurrence of multiple xanthomata leads the investigator into the study of blood cholesterol and its relation to the reticulo-

endothelial system, the hypermetabolism of lymphatic leukemia causes speculation on the problem of hypermetabolism in general, and, of course, the importance of the gastrointestinal tract in the pathogenesis of many cases presenting anemia is becoming ever more apparent Hematology has thus definitely loosened the morphologic shackles which once bound it and has, in response to the times, become increasingly physiologic It becomes, therefore, more generally apparent that there are in reality no diseases of the blood per se, but rather that various disorders are present in which the blood-forming organs have become implicated

#### BLOOD FORMING ORGANS

Interest in study of the bone marrow during life has become nothing short of extraordinary In the past year alone two monographs have been written on sternal puncture one by Elsa Segerdahl (*Acta med Scand Supp* 59 173, 1934), the other by Nils G Nordenson (*Gen-cialstabens Litografiska Anstalts Forlag Stock-*

From the Medical Service and Hematology Laboratory Beth Israel Hospital Boston I am indebted to F A Davis Co Philadelphia publishers of the *Cyclopedia of Medicine* for permission to use certain of the material in the Section on Hematology (edited by William Dameshek) of the Revision Service for 1936

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content of the urine and in ameliorating the many symptoms

**Copper** A Sachs, V E Levine, and A A Fabian (*Arch Int Med* 55 227 [Feb] 1935) studied the copper and iron content of the blood in normal subjects. The copper content was about 131 to 132 mg per 100 cc, whereas the iron content varied from 45 to 50 mg. In anemia, an inverse relation between the blood iron and copper was found, hypercupremia being present when the blood iron was low. The significance of this observation is not yet completely clear although it would seem to indicate that copper therapy would theoretically be of no value in iron deficient states

#### BLOOD CELLS

**Red Blood Cells** E E Osgood (*Arch Int Med* 56 849 [Nov] 1935) continues his careful formulations of normal hematologic standards and presents his results of the study of 500 normal cases. This exhaustive study, although it makes dull reading, is exceedingly valuable from the comparative standpoint. In another paper, E E Osgood and R L Baker (*Am J Dis Child* 50 343 [Aug] 1935) present similar studies in normal children of school age and give definitions of what constitutes anemia and polycythemia in children. H Daum (*Folia haemat* 53 1, 1934) makes a careful study of the various types of basophilic red cells (polychromatophilic cells, reticulocytes and stippled cells). She concludes that all of these cells are substantially identical and that their varying appearances (due to staining and fixing methods) are mostly artefacts. Polychromatophilic red cells and reticulocytes are identical but the stippled cells probably represent toxically changed immature red cells in which the cytoplasm has undergone a so far undiscovered colloidal change. J S P Beck and C S Hertz (*Am J Clin Path* 5 325 [July] 1935) describe a test tube method for demonstration of sickled red cells which consists in fixing the red cells with formaldehyde after they have assumed their characteristic form in a test tube filled with oil. Permanent preparations for classroom or other use may then be made.

**Sickling** Although this abnormality of the red cells is undoubtedly more common in the colored race, it is by no means limited to that group. More and more cases are being reported in white people. Thus, D J Stephens and A J Tatelbaum (*J Lab & Clin Med* 20 375 [Jan] 1935) report the study of 15 members of an Italian family, 8 of whom exhibited elliptical erythrocytes.

Another inherited characteristic in the red cell is the well-known and extremely important one of "blood group." The 4 blood groups which are utilized in transfusions are of only

occasional value in establishing paternity in questionable cases. A S Wiener, in collaboration with R Zinsher and J Selkove (*J Immunol* 27 431 [Nov] 1934) continues his work on the agglutinogens M and N discovered in 1927 by Landsteiner and Levine and with the use of which it is possible to increase the chance for establishing definite knowledge as to paternity in 1 out of 3. The subject of blood groups in all its aspects is fully covered in a recent volume by A S Wiener ("Blood Groups and Blood Transfusion," Charles C Thomas, Springfield, Ill., 1935).

**White Blood Cells** D Mainland, B Du Biher, and C B Stewart (*Canad M A J* 33 667 [Dec] 1935) and D Mainland, B K. Coady, and S Joseph (*Folia haemat* 54 8, 1935) set out to study the accuracy of differential blood counting and by extremely time-consuming investigations arrived at the conclusion that a good deal of variation existed between successive counts of the same film and duplicate counts of two films taken simultaneously. This is undoubtedly true, but how much practical significance attaches to this observation is doubtful since the blood itself is no exact composition of cells and since no exact inferences should be drawn from a differential count. W E Garrey and W R Bryan (*Physiol Rev* 15 597 [Oct] 1935) review their careful work on variations in white cell counts and give an excellent review of the literature. Garrey's work has been abundantly confirmed, particularly that relating to the basal leukocyte count. Garrey and Bryan take up such factors as daily variations, posture, random activity, exercise, training, adrenin, digestion, starvation, climate, pregnancy, emotional states, distribution phenomena, and cell life-span. This is an excellent review and should repay careful reading. A H Washburn (*Am J Dis Child* 50 413 [Aug] 1935) continues his standardization of the blood of healthy young infants. These studies are of course extremely important in the appreciation of what constitutes abnormality and are too often disregarded. In normal children, Washburn brings out that the total leukocyte count may vary widely and be subject to great fluctuation, particularly in the lymphocytes. So striking is this fluctuation that it is often unwise to make a conclusion from the study of one blood smear. E A. Gall (*Am J M Sc* 191 380 [March] 1936) describes a "previously undescribed granule within the lymphocyte." This is a motile, refractile globule normally present in the cytoplasm of 34 per cent of lymphocytes. Its significance is unknown. H S Dunning and J Furth (*Am J Path* 11 895 [Nov] 1935) conclude that microglia of the brain and histiocytes are morphologically and functionally identical and constitute a single cell type. Monoocytes may trans-

rather than to go to the trouble of taking readings every few minutes, and (2) some such anti-coagulant as ammonium-potassium oxalate or sodium citrate

#### CERTAIN CHEMICAL CONSTITUENTS

**Hemoglobin** The methods for the estimation of hemoglobin in the blood continue to be as numerous as they are unsatisfactory. The percent method for recording the amount of hemoglobin continues to be used, despite the great differences in what constitutes 100 per cent. The Sahli method continues to be the most satisfactory clinical method now in use. When properly calibrated against either the Van Slyke  $O_2$  capacity method or an accurate total iron method, and with due attention to the minutiae of technique, an accuracy of  $\pm 3$  per cent can be obtained. This is about as good as can be obtained with the more elaborate Newcomer acid hematin method. H. W. Josephs (*Bull Johns Hopkins Hosp* 56:50 [Jan] 1935) compared hemoglobin values determined by the Newcomer method and calculated from the iron content in a group of children. There was a high degree of correlation between these two methods in the normal group, under certain abnormal conditions, however, there was more iron in the blood than could be accounted for by the hemoglobin as determined by the Newcomer method. T. G. Klumpp (*J Clin Investigation* 14:351 [May] 1935) determined the hemoglobin in 57 subjects from estimations of the oxygen capacity and total blood iron and frequently experienced discrepancies which he attributes to the presence of nonhemoglobin iron. For these reasons, he states, it is fruitless to attempt to correlate the values for hemoglobin and oxygen capacity with determinations of total blood iron. This view is in direct contradiction to that of Peters and Van Slyke in their textbook and to the experience of the reviewer since there is, almost invariably, striking correlation between the blood iron and oxygen capacity methods for the determination of hemoglobin. With increasing use of the spectrophotometer or the photometer with various special filters, hemoglobinometry may yet become both simple and accurate. At the present time, it seems best to rely on the Sahli or Newcomer methods for clinical usage and on iron or oxygen capacity methods for research accuracy.

**Spectroscopic Methods** There has recently developed a great increase in the use of spectroscopic methods for the detection and measurement of minute quantities of various substances in the blood. The day of the colorimeter seems gradually to be passing and in its place is coming the era of the photometer and spectrophotometer that utilize a given wave length of light for measurements of intensity of an un-

known solution. The spectrograph measures the actual amount of metallic material in a solution by photography of the spectral lines which are formed on ignition. H. Blumberg and T. F. M. Scott (*Bull Johns Hopkins Hosp* 56:311 [June] 1935) studied the blood lead in clinical lead poisoning and found that about 90 per cent of the lead was carried within the red blood cells, probably in comparatively firm combination. H. Blumberg and T. N. Carey (*J A M A* 103:1521 [Nov 17] 1934) point out the dangers of the continued use of silver preparations, such as argyrol, and demonstrate the large amounts of silver in the blood of a patient with obscure argyria by means of the spectrograph. These authors suggest the prophylactic use of the spectrographic examination of blood for high and persistent silver content during the use of silver arsphenamine, silver nitrate, mild silver protein, neosilvol, and so forth. Along the same lines are the observations of L. E. Gaul and A. H. Staud (*Arch Dermat & Syph* 30:697 [Nov] 1934, *J Nerv & Ment Dis* 81:265 [Mar] 1935, *J A M A* 104:1387 [Apr. 20] 1935). These investigators perform "bio-spectrometric analyses", in which a quantitative spectrographic analysis is made for metallic constituents of an incinerated bit of skin removed at biopsy. By the use of this method, they demonstrated the retention of nickel in psoriasis, lead in cases of workmen coming in contact with lead paints, and of silver following organic and colloidal silver medication.

**Porphyria** Recently a great deal of interest has developed in the porphyrins and in their relation to the metabolism of hemoglobin. The porphyrins are the primary pigments from which are formed such secondary pigments as chlorophyll and hemoglobin. Bilirubin is isomeric with the porphyrins. Fischer studied these substances exhaustively and synthesized them. One of them, coproporphyrin, has been identified by Borst and Königsdorffer (1929) in the megaloblasts of pernicious anemia and the speculation has been made that these cells were laboring under abnormal or deficient living conditions. C. J. Watson (*J Clin Investigation* 14:116 [Jan] 1935), who has been one of the few investigators in this country studying this problem, isolated coproporphyrin I from the feces of two typical cases of pernicious anemia. The primary disturbance in this disease may not be in hemoglobin but in its precursor, porphyrin. What relation exists between such widely separated clinical diseases as pernicious anemia and congenital porphyria has yet to be established. In a well studied case of the latter disorder (K. Horsch and C. Carrié, *Ztschr f Klin Med* 129:214, 1935), therapy with liver extract was quite successful in reducing the porphyrin

changes in some quantitative scheme or index. There have been too many indices introduced already into such a nonmathematical tissue as the blood, and their permanent value is doubtful.

#### BLOOD PLATELETS

These third formed elements deserve more attention than they usually obtain in the routine study of the blood. The chief reason for this is, of course, the relative difficulty in their enumeration. The methods, although numerous, are frequently very time-consuming and often no more accurate than the approximate estimation from the blood smear. The various methods are reviewed by I Olef (*J Lab Clin Med* 20 416 [Jan] 1935), who discusses the various types of solution, methods for obtaining and diluting the blood and the relative values of the "direct" and "indirect" methods. He concludes that the "indirect" methods are the most accurate and suggests the use of a modified sodium metaphosphate solution used with a wax mixing cup for preparing proper dilution. In a recent article, R B H Gradwohl (*J A M A* 105 1030 [Sept 28] 1935) describes a rather involved staining method for the enumeration of the platelets. This seems to the reviewer defective in that, after dilution the mixture of blood and stain is spread on glass slides, a method which disturbs greatly the fundamental relation of the red blood cells to platelets. The reviewer has had occasion recently (unpublished data) to reexamine his own method (*W Dameshek Arch Int Med* 50 579 [Oct] 1932) in which through the use of brilliant cresyl blue, simultaneous platelet and reticulocyte counts may be made. Comparison of this method with several others has again demonstrated that, despite its simplicity, it compares favorably with other more time-consuming methods and is about as accurate as is possible when working with such easily agglutinable bodies as the platelets. The platelets are of importance not only in thrombocytopenic purpura but in the formulation of a complete "index" of bone-marrow activity. Thus, by doing counts of the red cells, leukocytes, reticulocytes, polymorphonuclears and platelets, the extent of bone-marrow activity can be estimated with a fair degree of accuracy.

#### ANEMIA

**Classification** The classification of the various types of anemia according to cell size continues to be widely utilized. To label a case presenting anemia as "primary" or "secondary" is now old-fashioned, since all cases of anemia are secondary to some cause, whether or not this cause is readily demonstrable. It is therefore wise, as pointed out in last year's review, to describe cases of anemia as macrocytic, microcytic or hypochromic, and normocytic.

The determination of cell size may be made in 2 ways: (1) The study of the actual size of diameter of the red cell with the micrometer eyepiece or by the use of a diffraction screen apparatus, and (2) the determination of the mean corpuscular volume.

The mean corpuscular volume is obtained by dividing the hematocrit (percentage volume of packed red cells) times 10 by the red cell count in millions. Thus, if the hematocrit is 46 and the red cell count 50 million, the mean corpus-

$$46 \times 10$$

cular volume is  $\frac{46 \times 10}{50} = 92$ . The resultant

figure is expressed in cubic micra.

Normocytic = 84-94 (up to 100 frequently) cu micra

Macrocytic = over 100 cu micra

Microcytic = under 70 cu micra

H E Bock (*Munchen med Wchnsch* 81 1646 [Oct 26] 1934) describes results obtained in his study of anemia with the measurement of the red cells by "diffraction micrometry" and finds its chief use in the diagnosis of pernicious anemia. In parenchymal disease of the liver, carcinoma of the stomach, and in certain cases of achylia gastrica, he found that macrocytosis of the red cells was frequently present. R L Haden (*J A M A* 104 706 [Mar 2] 1935) was one of the first to utilize the method of cell-size for classification of the anemias, although his classification is somewhat more complicated. As Haden states, the macrocytic anemias are usually dependent upon a megaloblastic marrow which, in turn, is dependent upon "liver" deficiency. The microcytic or hypochromic anemias are dependent upon iron deficiency (hemoglobin lack). Normocytosis indicates that cells of normal size are being produced by whatever marrow tissue is present (aplastic anemia, and so forth). As pointed out in last year's review, the term macrocytic anemia, and so forth, should be followed by a list, if possible, of the various etiologic agents present. (Thus macrocytic anemia achylia gastrica, hepatic insufficiency, poor dietary.) This method of classification immediately gives a general idea of the type of anemia present and the various etiologic agents help to give an understanding regarding the underlying physiology. The literature is so replete with terms and names describing not only classifications more or less involved but also specific types of anemia, that any attempt to add a new name should be vigorously opposed. This may be said for the term "achrestic anemia" proposed by J F Wilkinson and M C G Israels (*Brit M J* 1 139 [Jan 26] 1935) for the description of certain cases of macrocytic anemia associated with the presence of free hydrochloric acid in the stomach, the blood picture of pernicious anemia, and

form into cells indistinguishable from microglia. This observation is of great significance as indicating the functional capacities of the microglia since, if they are truly monocytes, they are then part of the widespread and important reticulo-endothelial system.

That the white cells in the circulating blood continue to be the objects of such intense study would seem to be explained by the relatively recent interest in the monocyte as a third type of blood cell, by the increasing use of the careful differential count of the Arneth-Schilling types, and by the gradual diffusion of the knowledge that the white cells of the circulating blood may (in a very limited way, to be sure) be considered as representing the various blood-forming organs. Reactions of the bone-marrow, the lymphoid system, and the reticulo-endothelial system can to some extent be predicted from the examination of a blood smear.

So many articles (often unduly enthusiastic) have been written on the value of the Arneth-Schilling counts in the study of various infectious diseases that it is refreshing to come across a critical article. C. J. Young (*Brit M J* 2 109 [July 20] 1935) observed that the Arneth count sometimes fails to show a "shift to the left" (that is, the presence of immature polymorphonuclears) in acute infections and conversely, may show the left shift in the absence of infection. He feels that it is necessary to record the various types of cells in their absolute numbers, an absolute increase in the polymorphonuclear output is necessary in the interpretation of a count as evidence of infection. In tuberculosis the differential count has interested many observers. There continues to be discussion regarding the relative value of the sedimentation rate, the monocyte-lymphocyte ratio, and the count of the immature polymorphonuclears. To the reviewer, the type of determination made does not seem to be quite so important as the interest which is taken in the problem. It may be heresy to say this, but it would seem that tuberculosis is still best studied by the temperature chart, the physical findings and the x-ray examination. Occasionally, in every tuberculosis sanatorium, the problem of the value of the above procedures is taken up by an enterprising staff member. With the requisite enthusiasm, fruitful results are obtained. When, as often happens, interest lags, the tests give diminishing returns.

C. H. Smith (*Am J Dis Child* 49 327 [Feb.] 1935) examined the white cells with the supravital technique in 23 patients with the childhood type of tuberculosis. Smith states that the blood count supplies information of a more precise nature of the pathologic process than can be obtained from the complaints of the patient, the physical examination or the x-ray. The monocytes and the monocyte-lymphocyte

ratio are the best guides to early manifestations of activity. It may be stated parenthetically that the use of the supravital method in the study of the blood in tuberculosis is often impressive to the onlooker, but how much more information is obtained than by the use of the simple stains is often problematical.

G. Thiele (*Beitr z Klin d Tuberk* 86 126, 1935) compared the blood picture and the sedimentation rate of the red cells in 100 male patients with open tuberculosis. Although the sedimentation rate was frequently normal, the blood picture always showed considerable alteration, the neutrophils usually showing a shift to the left and the lymphocytes being increased. (The monocytes are not emphasized, as is common in European literature.) The author rejects Schilling's "phases" of "defense" and his interpretation of the hemogram because "they do not correspond to the real conditions." He feels that it is preferable to use Arneth's simplified neutrophil blood picture. G. L. Muller (*New Eng J Med* 211 248 [Aug 9] 1934) did a careful piece of work on the monocyte-lymphocyte ratio in 730 cases of tuberculosis and found a surprisingly close correlation between the ratio and clinical judgment. A high ratio of monocytes to lymphocytes is frequently of grave prognostic import, but may be misleading and may be associated with some such complication as an upper respiratory infection, pleurisy or pneumonia. E. M. Medlar (*Am Rev Tuberc* 31 621 [June] 1935) has continued his careful work on the differential count in pulmonary tuberculosis and has even devised a circular slide rule for use in estimating the severity of the infection present and its prognosis.

P. Cohen and S. L. Warren (*J Clin Investigation* 14 423 [July] 1935) studied the leukocytosis produced by artificial fever. There was a substantial relative and absolute increase in immature polymorphonuclears in 6 of 11 cases with a decrease in lymphocytes, suggesting a mobilization into the circulation of available and nearly mature myeloid cells. (These observations are interesting since the same findings are discovered in fever due to infection.) D. R. Meranze, T. H. Mendell, and T. Meranze (*Am J M Sc* 189 639 [May] 1935) studied the cytoplasmic changes in the neutrophil ("toxic changes") in infections and found that this study often gave more information than does the Arneth-Schilling count. These cytoplasmic changes are of various degrees of intensity ranging from slight irregularity and basophilism of the granules to vacuolization of the cytoplasm. The reviewer agrees with the authors that the polymorphonuclears should be examined closely for evidences of these changes, but would not go so far as to state that no hemogram is complete without the recording of toxic

Davis (loc cit), who gives a review of the various preparations of iron and their relative values, parenteral (injectable) iron is usually of little value because of the small amount of contained iron in the ampoule and, furthermore, because of the necessity for daily dosage. Larger doses if injected cause violent reactions.

The place of copper in the treatment of iron deficiency still remains debatable. C. A. Elvehjem, who has contributed a large number of publications on this point, recently reviewed the entire subject (*Physiol Rev* 15:471 [July] 1935). Copper is present in all living matter. It appears to be essential in normal hematopoiesis in various laboratory animals, particularly in the rat. Copper alone is of no value, but in animals it appears to be a necessary adjuvant (catalyst?) to the action of iron. Whether it is of value in the treatment of hypochromic anemia in man is questionable, although several observers such as J. C. Hawksley (*Proc Roy Soc Med* 27:1066 [June] 1934) appear to have demonstrated its value in the hypochromic anemias of infancy. S. J. Ushe, P. N. MacDermot and E. Lozinski (*Am J Dis Child* 49:642 [Mar] 1935) report on the prophylaxis of anemia in infancy with iron and copper. The iron was given in the form of ferric glycerophosphate, 0.1 to 0.2 gm ( $1\frac{1}{2}$  to 3 grains), daily and the copper in the form of copper sulfate 0.001 to 0.002 gm ( $\frac{1}{64}$  to  $\frac{1}{32}$  grain) daily. The group of infants given both iron and copper not only failed to develop anemia, but also had lower morbidity and mortality rates, particularly following pertussis. The reviewer rarely uses copper and then only in those cases of hypochromic anemia which are unusually refractory to iron therapy. The dose in the adult group is 0.005 gm ( $\frac{1}{12}$  grain) daily.

#### PERNICIOUS ANEMIA

**Etiology.** Recent studies indicate that this prime example of a "primary" anemia is in reality, a syndrome representing the end-result of the interplay of numerous diverse factors. Chief among these are, besides a possible constitutional and hereditary tendency, the factors of an inadequate dietary, abnormalities in the gastrointestinal tract, and gross disturbance in the liver.

D. K. Miller and C. P. Rhoads (*J Clin Investigation* 14:153 [Mar] 1935) present what is undoubtedly the most important experimental contribution to the pathogenesis of pernicious anemia that has yet appeared. These investigators, by feeding dogs a "black-tongue"-producing diet, were able to produce some of the symptoms and signs of both pernicious anemia and sprue, the full-blown picture of pernicious anemia did not, however, develop, nor was there

relief with parenteral liver extract. It was concluded that the dog "was not suitable for the production of a pathology identical with that of the human disease." When, however, swine were used as experimental animals and fed a modified Goldberger-Wheeler black-tongue-producing diet, a symptom complex was produced characterized by macrocytic anemia, lesions of the oral mucous membranes, gastric achlorhydria, diarrhea and motor weakness of the extremities. Not only were these typical clinical manifestations of pernicious anemia present, but the bone-marrow was typically "megaloblastic," the gastric juice showed no trace of Castle's enzyme, and the liver, when extracted and injected, was completely devoid of activity. Furthermore, when potent liver extract was injected into these anemic swine, typical reticulocyte and erythrocyte responses took place. Thus, Miller and Rhoads have been able, by the use of an inadequate diet, to reproduce in an experimental animal the complete picture of pernicious anemia. The nature of the exact inadequacy in the diet must at present remain unsettled. It is apparently not vitamin B<sub>2</sub>. Whatever the missing food factor is, however, its first effect when lacking, is an inflammation of mucous membranes, leading, in turn, to atrophy and achlorhydria. Whether these experiments can be wholly applied to man is not yet clear.

Although these experiments of Miller and Rhoads again point to the rather definite possibility that pernicious anemia is somehow concerned with vitamin B deficiency, no exact proof of this has yet been advanced. One has the feeling that somehow vitamin B is concerned, but experimentation at least with animals has thus far been unsatisfactory. It is a curious commentary, that in work with pernicious anemia at least, the swine is closest to the human being in its reactions. Margaret C. L. Gildea, W. B. Castle, E. F. Gildea and Stanley Cobb (*Am J Path* 11:669 [July] 1935) who had maintained for years the relation between vitamin B and pernicious anemia and combined system disease conducted some interesting experiments on dogs. They were able to produce disturbances somewhat similar to those of combined system disease by a vitamin B<sub>1</sub> deficient diet in dogs that were kept from dying by the temporary use of small amounts of vitamin B concentrate.

Castle's concept that the disease is primarily due to a complete lack in a gastric enzyme, resulting thereby in a "conditioned deficiency," despite an adequate dietary, has recently been challenged. Thus, S. M. Goldhamer (*Proc Soc Exper Biol & Med* 32:476 [Dec] 1934) found that the "intrinsic factor" (Castle's enzyme) was present in cases of pernicious anemia although reduced in amount. By continuous suc-

lack of response to liver extract. This type of anemia is thought to be due to failure of utilization, "achrestia", of the antipernicious anemia principle in the liver.

**Chronic ("Primary") Hypochromic Anemia** Since there are, strictly speaking, no "primary" anemias, there can in reality not be such a disease as "primary hypochromic anemia." The reviewer introduced this term (W Dameshek *Am J M Sc* 182 520 [Oct] 1931) partly to indicate that some cases of hypochromic (low color index) anemia were just as "primary" as, for example, pernicious anemia, partly to indicate that even pernicious anemia was frequently a "secondary" anemia (poor dietary, gastro intestinal lesions, and so forth). It is certainly best at the present time to discontinue use of the word "primary" and to use instead the word "chronic." Patients, usually middle-aged women, presenting pallor, sores about the corners of the mouth, wrinkled skin, glossitis, achlorhydria, and hypochromic anemia, are suffering from chronic iron-deficiency which, in turn, is dependent upon such factors as an inadequate dietary, improper functioning of the stomach (achlorhydria, neoplasm) intestinal lesions, chronic occult bleeding, pregnancy, and so forth.

**Etiology** The relation of this disorder to various gynecologic abnormalities, particularly menorrhagia, has frequently been stressed. Thus, L A Gray and M M Wintrobe (*Am J Obst & Gynec* 31 3 [Jan] 1936) in a study of 40 cases of chronic hypochromic anemia found myomata uteri in 8, endometrial hyperplasia in 5, and unexplained menorrhagia in 14 cases. Furthermore, 12 patients gave a history of repeated pregnancies, postpartum hemorrhage or abortion. Although these figures are undoubtedly significant, it is unfortunate that a control series of women in the same age group were not studied in the same manner.

The association of hypochromic anemia with pregnancy has become well known, and it is likely that the fetus, in its necessity for hemoglobin, abstracts large quantities of the mother's iron store. M B Strauss (*Ann Int Med* 9 38 [July] 1935) continues his studies on this important subject. Pregnancy, when it occurs in women who are already of the hypochromic type (poor dietary, achlorhydria, and so forth), aggravates the condition strikingly. D T Davies and U Shelley (*Lancet* 2 1094 [Nov 17] 1934) studied 51 apparently normal pregnant women and 20 who had been frankly anemic following their last pregnancy. A normal gastric secretion was found in 45 women who passed through their pregnancies without anemia. Those that had had anemia at a previous pregnancy were found to show either complete achlorhydria or hypochlorhydria, considered to

indicate a permanent change in the gastric mucosa. The authors believe that the anemia is due in great part to long-standing gastric acidity, with resultant inadequate absorption of iron and, therefore, lack of available stored iron for the demands of pregnancy, an inadequate diet is also frequently present.

S J Hartfall (*Guy's Hosp Rep* 84 448 [Oct] 1934) presents a careful report of the anemia following gastrectomy and gastro-enterostomy. He found that of 91 cases of subtotal gastrectomy and gastro-enterostomy for ulcer, 50 per cent of the women and 16 per cent of the men become anemic, the anemia being usually of the hypochromic type and indistinguishable from that of idiopathic hypochromic anemia. The degree of anemia could be correlated with the amount of gastro-intestinal dysfunction resulting from the operative procedure. This was especially true in the cases in which gastro enterostomy had been performed with resultant extremely rapid passage of the bolus of food directly into the small bowel. The poor dietary which these patients usually follow was also considered to be a contributory matter by Hartfall. C W Heath (*M Clin North America* 18 1183 [Jan] 1935) discusses the anemia associated with carcinoma of the stomach and finds that it is usually of the iron-deficiency type. The anemia is explainable on at least 3 different mechanisms: loss of blood, inadequate diet due chiefly to anorexia, and achlorhydria.

**Treatment** The efficacy of iron in the treatment of these cases of chronic hypochromic anemia is universally conceded. These patients are suffering from an actual iron starvation which expresses itself in the blood as hypochromic anemia. The actual preparation of iron used and its dosage seem to be passing through certain definite cycles. Thus, for a long time, tiny doses of iron (such as reduced iron 1 grain—0.065 gm and so forth) were used. Then came the period a few years ago in which emphasis was placed on the necessity for very large dosage. This necessitated the use of 1000 mg (15 grains) of actual iron, as pointed out by W Dameshek (*West Virginia M J* 30 193 [May] 1934), which was obtained from 6 gm (1½ drams) of ferric ammonium citrate, 1 gm (15 grains) of reduced iron, and so forth. In the last year or two, the superiority of smaller doses of a soluble ferrous salt, such as ferrous sulfate, has been demonstrated. It is possible that the ferrous salts are better absorbed. C W Heath (loc cit) uses 0.6 to 1 gm (10 to 15 grains) of ferrous sulfate daily and C L Davis (*M Clin North America* 19 91 [July] 1935) found as good results from 0.8 gm (12½ grains) of this salt as had previously been given by 6 gm (1½ drams) of ferric and ammonium citrate. As pointed out by



M. M. Wintrobe and H. B. Shumacker, Jr (*Arch Int Med* 57 289 [Feb] 1936) The comments of Minot and Castle in the 1935 Year Book of General Medicine regarding this important subject should be read by those interested. They make this cogent observation "Since macrocytosis is common to the anemias of leukemia, Hodgkin's disease, aplastic anemia, benzol poisoning, and other anemias seemingly unrelated to pernicious anemia, it is scarcely to be expected that deficiency of liver extract will be found in all instances of pernicious anemia. The clinical evidence and the logic are equally in favor of the macrocytic anemia of such patients as having no dependence on deficiency of liver extract."

**Treatment** Aside from etiologic considerations, most of the articles about pernicious anemia are concerned with therapy. A completely satisfactory method for the assay of various antianemic substances has not yet been discovered, despite some interesting observations regarding the reticulocyte responses which occur in guinea pigs. B. M. Jacobson (*J Clin Investigation* 13 714 [July] 1934 and 14 665 [Sept] 1935) may be said to have created a mild sensation when he announced what was apparently the long sought for solution for an animal assay method for liver extract. This involved the use of guinea pigs which were "reactive" in the sense of a reticulocyte rise occurring after the administration intraperitoneally of a preparation of liver extract. In these reactive animals, a reticulocyte count of 2 per cent or over occurring for 2 days within 6 days after the administration of a test material indicated a positive response, a negative response was present with a reticulocyte count of 18 per cent or under in the same period. Not only did this investigator maintain that the reticulocyte response in guinea pigs was a specific one (dependent upon a "liver deficient state in normal guinea pigs") but he went farther and defined a unit of hematopoietic activity ("guinea pig unit") with which he was able to assay quantitatively various substances including the "intrinsic" and "extrinsic" factors of Castle. Jacobson's work was soon confirmed by D. K. Miller and C. P. Rhoads (*New Eng J Med* 213 99 [July 18] 1935) who stated that "it must be shown clearly that the induction of the reticulocyte response depends upon the same pathologic mechanism as that which obtains in the human being with pernicious anemia." Miller and Rhoads concluded that their experiments satisfactorily demonstrated this relation. It is well, however, to await the test of time before accepting this method as proved.\*

\*In an article published in 1936 by L. S. Goodman, A. J. Geiger and T. G. Klumpp (*J Clin Investigation* 15:425 [July] 1936) there is this footnote from a personal communication by Miller and Rhoads. Further experimentation has advanced incontrovertible evidence that guinea pig reticulocytes may in

The human assay of liver extract remains our only completely satisfactory one and this is beset with many difficulties which are discussed by W. Dameshek and W. B. Castle (*J A M A* 103 802 [Sept 15] 1934). These authors criticized the then current methods of labeling liver extracts and concluded that, in the refinement of the various extracts, potent material is lost to greater or less extent. (The Council on Pharmacy and Chemistry of the American Medical Association has taken cognizance of this and other work and has established [*J A M A* 105 1269 (Oct 19) 1935] new requirements for the acceptance of liver and stomach preparations.)

Efforts to isolate the antianemic principle in liver continue apace. B. Strandell (*Nord med tidsskr* 10 1217 [Aug 3] 1935) by an as yet secret method has been able to derive from 100 gm of liver from 1 to 27 mg of material which is therapeutically effective. H. D. Dakin and R. West (*J Biol Chem* 109 489 [May] 1935) have isolated a product from liver extract effective in very small dosage and which contains at least 6 amino acids. Y. Subbarow, B. M. Jacobson, and C. H. Fiske (*New Eng J Med* 212 663 [April 11] 1935) isolated from liver extract 2 substances both effective in guinea pigs. Fraction "A" which was apparently l-tyrosine contained 16,700,000 guinea pig units per gram of material. Fraction "C" which assayed 10,660,000 guinea pig units was apparently a complex purine such as is found in the wings of certain yellow butterflies. It should be noted that the work of Dakin and West and of Subbarow, Jacobson and Fiske seems to be mutually contradictable. The potency of the Dakin and West material has recently been investigated abroad by C. C. Ungley, L. S. P. Davidson and E. J. Wayne (*Lancet* 1 349 [Feb 15] 1936) and found to be quite active. Subbarow, Jacobson, and Fiske's assays on human subjects have not yet been published.

Aside from these rather theoretical observations, the search for the most effective and the most conveniently used antipernicious anemia substance continues unabated. The development of liver therapy has been traced by G. R. Minot (*Lancet* 1 361 [Feb 16] 1935) in his Nobel Prize lecture. It is an interesting commentary that when an injectable substance such as insulin is introduced, the medical public clamors for an

crease to a level of over 2 per cent from a variety of causes unassociated with the administration of substances effective in the treatment of pernicious anemia. Experiments are under way in an attempt to elucidate the cause of spontaneous variations in numbers of reticulocytes such spontaneous variations demand that the greatest care be used in employing the guinea pig as a test for anti-anemic substances. The article referred to of Goodman, Geiger and Klumpp would seem on its face to dispose effectively of Jacobson's method. A large and well arranged series of experiments is presented which inevitably lead to the following conclusion. "The normal adult guinea pig shows considerable and unpredictable spontaneous fluctuations in reticulocyte levels. These variations are of such a nature as to render this normal animal unsuitable for assaying the potency of materials effective in pernicious anemia."

tion of the gastric juice in cases of the disease a sufficient amount was obtained for the trial of Castle's experiment, in which incubation of the juice with meat protein is done, the resultant material being then fed to other patients with the disease. Typical reticulocyte and red cell rises took place, indicating the presence of an "intrinsic factor." C C Ungley and G V James (*Quart J Med* 3 523 [Oct] 1934) also state that many cases of pernicious anemia, although associated with a histamine-fast achlorhydria, may retain the ability to secrete an intrinsic factor. It is in these cases that yeast is effective, suggesting again the importance of the dietary or "extrinsic" factor.

That certain patients may possess no intrinsic factor and yet not have pernicious anemia is brought out by A L Bloomfield and W S Pollard (*J Clin Investigation* 14 321 [May] 1935), who cite also the previous work of C W Barnett (*Am J M Sc* 184 24 [July] 1932). Bloomfield and Pollard followed 43 clinic patients presenting total achlorhydria for several years. In none of these patients, including two in whom "intrinsic factor" had been shown to be absent, did pernicious anemia develop. These investigators feel that "only an occasional person needs the protection of the Castle-Minot anti-anemic substance to safeguard himself against the disease whatever the ultimate cause of it may turn out to be." Possibly some of the discrepant results may be due to the presence of additional factors in duodenal glands. E Meulengracht, E Schiodt and A S Ohlsen (*Acta med Scandinav* 82 352, 375, 384, 1934) studied carefully the antianemic factor in preparations of dried stomach substance from the cardia, fundus, and pylorus, respectively, and then E Meulengracht demonstrated (*Ugeskr f laeger* 97 725 [July 11] 1935) that the duodenum of swine, like the pyloric portion, possesses a marked antianemic activity. Meulengracht feels that the Brunner's glands of the duodenum are identical with the glands of the pylorus and proposes the term "pylorus gland organ" for the combined groups. These investigations are important as indicating that despite a defective stomach (gastrectomy, and so forth) pernicious anemia may not necessarily develop because of activity of the duodenal glands. T B Klumpp and S Koletsky (*Ann Int Med* 8 991 [Mar] 1935) and L G Zerfas and B S Cornell (*Am J Digest Dis & Nutrition* 1 857 [Feb] 1935) give excellent historical reviews of the relation of the gastric secretion and the diet to hematopoiesis.

A most important article relating to the pathogenesis of pernicious anemia is that on the "Etiology and Treatment of Sprue" by W B Castle, C P Rhoads, H A Lawson, and G C Payne (*Arch Int Med* 56 627 [Oct] 1935).

This paper is a model of clinical and experimental investigation and will doubtlessly be hereafter referred to as the classical paper on the subject. Sprue and pernicious anemia, these investigators demonstrate, are substantially identical diseases. Minor differences occur, to be sure, but these are no greater than among individual cases. Both diseases are examples of closely related deficiency disease, the chief manifestations consisting in disturbances of the tongue, stomach and intestines, the anemia, and (rarely in sprue) the degenerative lesions of the spinal cord. All the hematologic, gastric, and bone-marrow findings closely corresponded in the two diseases and the clinical manifestations were invariably benefited by adequate doses of parenterally injected liver extract. The inadequate dietary seemed more important in sprue than in pernicious anemia.

M M Wintrobe and H B Shumacker, Jr (*J Clin Investigation* 14 837 [Nov] 1935) contribute an intriguing paper on the relation of fetal hematopoiesis to the macrocytic anemia of pregnancy and anemia in infants. These authors studied the blood of 12 obviously nonviable human fetuses removed by hysterectomy, together with that of fetuses of rabbits, rats, pigs, dogs and cats. "Anemia" was always present in the fetus, gradually diminishing in severity as the fetus matured. The anemia was of the macrocytic variety, with extremely high mean corpuscular volumes and mean red cell diameters. The rising values in the red blood count with increasing maturity of the fetus was strikingly similar to the rising erythrocyte level with specific therapy in pernicious anemia. These observations bring up many interesting speculations that the fetus suffers from a "liver deficient" state which gradually becomes ameliorated as "liver substance" is removed from the mother, that in certain instances, the mother's store of liver substance may become so depleted that she herself will develop pernicious anemia, and that the very grave anemia of the newborn known as erythroblastosis fetalis may be due to "liver deficiency." (The latter observation has been questioned, J F Wilkinson and M C G Israels (*Brit M J* 1 139 [Jan 26] 1935) conceive that in certain cases of apparent pernicious anemia which do not respond to liver extract there may be an actual inability to utilize liver (achrestia—achrestic anemia). This is an attractive hypothesis which may be of service (at present) in explaining the refractoriness to therapy of certain cases of pernicious anemia.

Much interest has recently been stimulated by the insistence of various authors in the identity of the macrocytic anemia associated with certain cases of hepatic disease with pernicious anemia (S M Goldhamer, R Isaacs, and C C Sturgis [*Am J M Sc* 188 193 (Aug) 1934],

marrow spaces, aplasia of the marrow as the result of a poison such as benzol, radioactive substances, gold and so forth. The diagnosis is often extremely difficult in these cases and requires very careful study. In the reviewer's hands bone-marrow biopsy has proved of great value in just these cases.

**Aplastic Anemia** Under the heading of "marrow insufficiency" W. S. Middleton and O. O. Meyer (*Ann Int Med* 8 1575 [June] 1935) report several cases of aplastic anemia which they feel represent complete failure of bone marrow growth with resultant anemia, leukopenia, and thrombocytopenia. This failure of the bone-marrow in toto may be "selective" in character, only the red cells, the white cells or the platelets being affected. If the platelets alone are affected, thrombocytopenic purpura results, if the leukocytes alone are involved, agranulocytosis develops. Thus is beautifully illustrated in cases of poisoning with gold salts and with arsphenamine, in certain cases anemia, in certain cases thrombocytopenia, in others leukopenia being present. Middleton and Meyer (*loc cit*) suggest that these entities of aplastic anemia, thrombocytopenic purpura and agranulocytosis are interrelated diseases. Newly discovered etiologic agents active in the causation of aplastic anemia are constantly being found. Thus, C. W. Baldrige (*Am J M Sc* 189 759 [June] 1935) describes a group of 3 cases of macrocytic anemia following the use of hair dye, the first of these cases was typical in all its features of aplastic anemia. Many hair dyes contain various aniline derivatives and are therefore potentially dangerous.

As regards treatment, no advance has been made. Transfusions are given until the patient shows evidences of recovery or until the condition seems hopeless. Liver extract, pentnucleotide, iron, and so forth, seem to be of no value. C. A. Doan (*Cyclopedia of Medicine*, Revision Service, 1936) suggests splenectomy in selected cases.

**"Splenic Anemia"** As stated in previous reviews, the term splenic anemia means very little and is more often a hindrance rather than a help in diagnosis and treatment. There is literally a host of conditions in which, together with splenic enlargement, anemia is present. In fact, it is decidedly unusual to have splenic enlargement without some degree of anemia. The term "splenic anemia" has therefore been applied to about every condition in which splenomegaly is present: typhoid fever, malaria, syphilis of the spleen and liver, chronic infectious processes especially in children, cirrhosis of the liver, amyloidosis, Gaucher's disease, myelogenous leukemia, Hodgkin's disease, lymphosarcoma, and so forth. That there is a condition distinct from cirrhosis of the liver primary in the spleen, characterized by spleno-

megaly, anemia, leukopenia and without etiologic background is seriously open to question, despite the popularity of the now synonymous terms splenic anemia and Banti's disease. The late Ralph C. Larrabee\* (*Am J M Sc* 188 745 [Dec] 1934) analyzed 47 cases which most people might have called Banti's disease and in which an etiologic factor was not readily discernible. In 14 of these cases, the etiologic factor was never discovered, in the other 33, the following factors were discovered: alcoholic cirrhosis, toxic cirrhosis, syphilitic cirrhosis, other types of cirrhosis, hepatic abnormalities not cirrhosis, adhesions, congenital heart, ptosis of the spleen. In about one-half the cases, cirrhosis of the liver was present and the splenomegaly in most if not all was due to various lesions interfering with the outflow of blood from the spleen. The changes in the spleen were interpreted by the pathologist (F. B. Mallory) to be due to long-continued passive congestion.

In an exceedingly interesting presentation of a case record (Case Records of the Massachusetts General Hospital *New Eng J Med* 213 373 [Aug 22] 1935) participated in by an internist, a pediatrician, a surgeon, and the pathologist, the subject of splenic vein thrombosis is discussed from various angles. Banti, in his original articles on splenic anemia, undoubtedly included a variety of different disorders in which such similar features as splenomegaly, hepatic cirrhosis, anemia, and leukopenia were present. In recent years, the importance of splenic vein thrombosis has been recognized as the initial factor in certain cases of splenomegaly characterized by hematemesis without involvement of the liver in a cirrhotic process. The hematemesis may be due to secondary engorgement in the portal circulation, with resultant involvement of esophageal veins, or to dilation with rupture of the vasa brevia of the stomach. These cases tend to occur chiefly in children (R. M. Smith and P. J. Howard *Am J Dis Child* 34 585 [Oct] 1927) and splenectomy, although of temporary value, does not result in cure, since other thromboses in the portal circulation usually result and the patients almost invariably die of repeated hematemesis. H. D. Lemoff (*Ann Int Med* 9 85 [July] 1935) presents a case of this type illustrating the difficulties in diagnosis. The patient described was operated upon 5 times before the real diagnosis became apparent and splenectomy was done with relief. Before making a diagnosis of so-called splenic anemia, it behooves the physician to rule out all the possible causes of splenomegaly, associated with

Dr. Larrabee died in 1935. He was primarily a clinician and was distinguished by his sound often homely judgment in blood conditions. He was one of the first American physicians to become interested in abnormalities of the blood-forming organs and organized the first Blood Laboratory and Blood Service in Boston at the City Hospital.

oral preparation and then when an oral preparation such as liver extract is discovered, the cry is for an injectable material. Now we have dry powdered liver extract, dry gastric extract, dry liver extract activated by gastric extract ("extralin"), liquid oral liver extract (both alcoholic and nonalcoholic), and a large number of assorted types of injectable liver extract. It is no wonder that the practitioner is sometimes bewildered by the wealth of material at his command and by the conflicting claims of rival manufacturers. It may be stated here that some few patients, chiefly those without neurologic involvement, may be well maintained on one of the oral extracts whether dry or liquid. Others, and especially those in whom neurologic symptoms are prominent, require frequent injections of a potent parenteral extract. This is given daily, twice weekly, weekly or biweekly depending upon the type and severity of the case at hand. The reviewer is accustomed to use a so-called "concentrated" extract given usually weekly or biweekly and at times supplemented either by liver itself or by some form of oral liver extract. One should not be misled at the present writing by the attractive promises of potency inherent in extreme concentration. Several observations have recently been made indicating that prolonged and intensive therapy with parenteral therapy is effective in the treatment of the neurologic lesions of pernicious anemia (R. F. Farquharson, *Canad M A J* 33 473 [Nov] 1935, M. B. Strauss, P. Solomon, A. J. Schneider, and A. J. Patek, Jr., *J A M A* 104 1587 [May 4] 1935).

Liver therapy is of value not only in pernicious anemia proper but in all conditions in which "liver deficiency" is present, even when the cause (such as pregnancy, fish tape worm, poor dietary) is readily apparent. Thus W. B. Castle, C. P. Rhoads, H. A. Lawson and G. C. Payne (*Arch Int Med* 56 627 [Oct] 1935) report the remarkable effects in sprue.

Recently, a peculiar, shall we say, atavism, came into being, namely the idea that pernicious anemia is a "toxic" state, to be treated by a detoxifying agent, that is, Congo red. This idea was promulgated by M. Massa and G. Zolezzi (*Klin Wchnsch* 14 235 [Feb 16] 1935) who described the results of the injection of a 1 per cent solution of Congo red intravenously in 14 cases. Careful review of their cases will show that the favorable results are usually greatly delayed in their inception and frequently helped along by liver or other anti-anemic substances. More recently, their work is said to have been confirmed by C. Mermod and W. Dock (*Science* 82 155 [Aug 16] 1935) who treated two cases in similar fashion. They were also able to obtain rises in guinea pig reticulocytes with the dye. What, if any, ra-

tionale there is to the procedure is as yet a mystery. Two cases of the reviewer's relapsed to very low levels when given Congo red. It is no great prophecy to foretell that this new treatment is doomed to an early demise.

The therapeutic effects of vitamin B in pernicious anemia continue to be studied. D. K. Miller and C. P. Rhoads (*New Eng J Med* 211 921 [Nov 15] 1934) first fed mixtures of gastric juice incubated with vitamin B<sub>1</sub> containing substances to patients with pernicious anemia and failed to obtain responses. However, when egg white (containing vitamin B<sub>2</sub>) and gastric juice mixtures were fed to the same patients, sharp increases in reticulocytes took place. Despite this striking experimental evidence, Miller and Rhoads are unwilling to conclude that vitamin B<sub>2</sub> and the antipernicious anemia factor are identical. This must await isolation of the vitamin in pure form. C. C. Ungley and G. V. James (*Quart J Med* 3 523 [Oct] 1934) did some interesting experiments with various vitamin B concentrates and yeast autolysates in human pernicious anemia and at times, especially when "Mannite" was used, obtained fairly satisfactory therapeutic results. This was especially true in those cases distinguished by a deficient dietary. H. C. A. Lassen and H. K. Lassen (*Am J M Sc* 188 461 [Oct] 1934) in their experiments with various fractions of vitamin B showed pretty conclusively that neither vitamin B<sub>1</sub> nor vitamin B<sub>2</sub> had any antianemic effect in cases of pernicious anemia and that these substances were therefore not the "extrinsic" substance. Is it not possible that various investigators are working with different cases of pernicious anemia? Not every case of macrocytic anemia is brought about in the same way. Some cases undoubtedly react to a good diet or to a high vitamin B diet, perhaps these have had a deficient diet. Those cases which do not might have developed the pernicious anemia "complex" through some other mechanism.

#### Other Types of Anemia

When we finish with the description of chronic hypochromic anemia and the pernicious anemia group, there is left a small number of conditions in which, although anemia is an outstanding feature, there is neither evidence of iron deficiency nor liver deficiency. The practitioner may discover this as frequently happens, when a given case fails to respond both to liver and iron. Or it may be suspected when the anemia is of the normocytic or somewhat macrocytic type, and associated with very low leukocyte and platelet counts. In these cases of obscure anemia, conditions of marrow destruction must be considered—"aleukemic" leukemia with marrow replacement, lymphosarcoma or other malignant tumor metastasizing widely into the

derestimate the importance of the abnormality of the red cells as shown by others

An occasional article is written on an unusual type of hemolytic anemia apparently infectious in origin and first described by Lederer in 1925 and Brill in 1926. The disorder is also well described in a case report by F. Corelli (*Haematologica* 17:141, 1936) and is characterized by acute onset with high fever, dyspnea, extreme asthenia, icterus, macrocytic anemia, leukoerythroblastosis, and favorable prognosis with transfusions and liver extract.

**Erythroblastic (Cooley's) Anemia.** There has been no definite advance in the delineation of this disease which, like congenital hemolytic icterus, is characterized by excessive blood destruction in association with increased blood formation. The latter is frequently so striking that the enlarged marrow spaces result in defects (striae) of the skull visible by x-ray. There is at least one important difference, however: splenectomy is of no value in Cooley's anemia. D. H. Kelly and L. F. Hill (*J. Iowa M. Soc.* 25:9 [Jan.] 1935) summarize the findings in this disease: constant racial (Mediterranean peoples) and familial incidence, mongoloid facies, many nucleated red cells in the peripheral blood, splenomegaly, changes in the bones. H. W. Josephs (*Internat. Clin.* 2:139 [June] 1935) groups erythroblastic anemia, sickle cell anemia, and congenital hemolytic anemia together since they not only have definitely constitutional factors, but all have somewhat similar blood pictures dependent upon the interaction of (1) hemolysis, (2) compensatory regeneration, and (3) a tendency on the part of the blood-forming tissue to produce immature forms. A somewhat similar line of reasoning is espoused by H. Lehnendorff (*Schweiz. med. Wchnschr.* 65:333 [April 13] 1935) who classifies under the term "erythroblastic disease" the following: fetal erythroblastoses, congenital hemolytic jaundice, Cooley's anemia, and even the almost defunct von Jakseh anemia. He takes the rather extreme view that the erythroblasts present in these cases are evidences not of excessive bone-marrow activity, but are abnormal blood cells, abnormally found in the marrow and of no value as oxygen carriers in the blood.

**Sickle Cell Anemia.** C. S. Rverson and K. L. Terplan (*Folia haemat.* 53:353, 1935) report two unusual cases in which careful autopsies (all too few in the disease) were done. In one rather acute case, the extreme degree of anemia seemed to be directly responsible for death; in the other case, there was severe degeneration of the liver. Attention is again directed to the extremely small size of the spleen often present in these cases. 2 gm. in one case.

**Anemia in Children.** The same etiologic factors are present in the anemias of infancy and childhood as are present in adult cases of anemia. These are well described by L. G. Parsons and W. C. Smallwood (*Practioner* 134:298 [March] 1935). There are, however, a few abnormalities inherent to infancy. H. W. Josephs (*Bull. Johns Hopkins Hosp.* 55:335 [Nov.] 1934) studied the physiologic anemia developing in normal infants during the first two months of life. This he found was due mainly to increased blood destruction although this phenomenon did not wholly account for the anemia. *Erythroblastosis fetalis* or *icterus gravis neonatorum* has been well described recently, among others, by L. G. Parsons and W. C. Smallwood (*Practioner* 134:298, 1935). This occurs in newborn infants and is characterized by intense jaundice, a blood picture resembling the bone-marrow in the large variety of all types of cells present, and occasionally degenerative lesions in the brain ("kernikterus"). The cause of the condition is unknown but it seems to be a congenital defect of the blood-forming organs. Judiciously given transfusions repeated frequently have proved lifesaving in many instances (L. K. Diamond, Personal communication). H. M. Zimmerman and H. Yarnet (*Am. J. Dis. Child.* 49:418 [Feb.] 1935) describe the cerebral manifestations of the disease which are characterized by mental retardation, spasticity, athetosis, convulsions, and emotional instability. These changes are apparently due to involvement of the basal ganglia by the intense jaundice.

**Nutritional Anemia.** Parsons and Smallwood and J. C. Hawksley, R. Lightwood, and U. M. Bailey (*Arch. Dis. Childhood* 9:359 [Dec.] 1934) describe the "milk anemia" of infants which in many respects is similar to the chronic hypochromic anemia of adults, and dependent upon the low iron content of a milk diet too long persisted in. In treating the iron deficiency anemia of children the following preparations are useful: reduced iron, 1 gram t.i.d. mixed with 2-3 times its weight of sugar, elixir or syrup of ferrous sulfate. Too much has been said about the use of copper in infants. The reviewer feels that this drug is too dangerous for indiscriminate use even in infants.

#### HEMORRHAGIC DISORDERS

W. H. Howell, one of the pioneer workers on coagulation of blood, writes an excellent review of the theories of blood coagulation (*Physiol. Rev.* 15:435 [July] 1935), with particular reference to the literature appearing since 1929. He deplores the enormous number of facts which have been adduced and the lack of uniformity of conclusion derived from these facts. The theory of Morawitz is still main-

anemia Chief among these are aleukemic leukosis, luetic splenohepatomegaly, chronic malarial spleen, cirrhosis of the liver, Hodgkin's disease, congenital hemolytic anemia, and so forth Occasionally, after numerous diagnostic procedures are accomplished, there is left a case in which is present unexplained splenomegaly, leukopenia, slight anemia and, frequently, hematemesis The diagnosis of Banti's disease may then be considered R. W. B. Ellis (*Practitioner* 134 317 [Mar.] 1935) states that in a child with splenomegaly and anemia, there must be ruled out the presence of a generalized infection such as syphilis, tuberculosis or a subacute streptococcal infection Malaria and kala-azar should be considered D. O. Wright (*Ann Int Med* 8 814 [Jan.] 1935) points out that a macrocytic anemia may occur in Banti's disease when portal cirrhosis is present This may be linked up with the macrocytic anemia of cirrhosis of the liver, as described by Goldhamer Wright states that the concept that Banti's disease is always accompanied by a microcytic type of anemia is erroneous

Splenectomy in cases of "chronic congestive splenomegaly" (to use Larrabee's term, which seems a good one) was discussed at length at a symposium on splenectomy held at the 1935 meeting of the American Medical Association C. A. Doan, G. M. Curtis, and B. K. Wiseman (*J A M A* 105 1567 [Nov. 16] 1935) although noting the dangers inherent in the operation in late stages of the disorder, made a plea for the operation in early cases They felt that splenectomy might either delay or even prevent the progress of the disease It is difficult, as brought out in the discussion of this paper, to bring oneself to splenectomy in an early case, in which diagnosis is so difficult, again, it is well known that many cases survive for 5 to 20 years after an initial hematemesis from esophageal or gastric varices in which nothing has been done The statistics for splenectomized and nonsplenectomized cases in a comparable series would probably show very little difference, and might be in favor of the nonsplenectomized group (which has not suffered the hazards of the operation)

**Hemolytic Anemias** It is customary to combine under this group not only congenital and acquired hemolytic jaundice, but erythroblastic (Cooley's) anemia, and sickle cell anemia, although it is recognized that the hemolytic factor in the latter 2 conditions may be slight

As pointed out in last year's review, the greatest advance recently made in *Congenital Hemolytic Anemia* is the recognition that the most important feature of the disorder is an abnormality of the red cells which are smaller and more spherical than normal and thus more ready to burst (R. L. Haden, *Am J M Sc* 188 441

[Oct.] 1934) Thus is brought out in vitro by the fragility test in which the red cells come in contact with hypotonic solutions of salt The spherical character of the cells is brought out not only by direct study but by comparison of the percentage volume of packed red cells with the red cell diameter The cell diameter in these cases is diminished, often greatly so and yet the hematocrit may be normal or even increased This can be due only to an increased thickness of the red cell which is a fundamental abnormality Other associated abnormalities were studied by K. Hansen and E. Klein in a large family with the disorder (*Deutsches Arch f klin Med* 176 567, 1934) tower skull, broad root of the nose, numerous abnormalities of the eyes, bilateral mongolian fold, carious dental abnormalities, and so forth H. Lehnendorff (*Med Klin* 31 74 [Jan. 18] 1935) presents an important article on the nature of congenital hemolytic disease which he calls "spherocytic disease" Lehnendorff states that this congenital disease may remain latent for a long time, but its manifestation may be brought on by such factors as infection, exposure, or overexertion When fully developed, 3 characteristic symptoms are present icterus, pallor, and splenomegaly, and 3 hematologic signs microcytosis, increased fragility of the red cells and increase in reticulocytes Microcytosis is most striking, and the red cells are spherical and therefore have a greater volume than the normal erythrocytes These spherical red cells being more fragile than normal, tend to be broken down more readily by the reticulo-endothelial system and therefore the spleen enlarges Lehnendorff feels that the nature of the disease is best explained by assuming a congenital abnormality of the erythropoietic system with the production of spherical rather than disc shaped red cells He feels that the treatment should be consistently palliative (liver, iron, transfusion) unless hemolytic crises supervene, when splenectomy is indicated C. A. Doan, B. K. Wiseman, and L. A. Erf (*Ohio State M J* 30 493 [Aug.] 1934) and C. A. Doan, G. M. Curtis, and B. K. Wiseman (*J A M A* 105 1567 [Nov. 16] 1935) point out the striking results which occur with splenectomy in these cases It is in this disease that the operation of splenectomy is most strikingly successful and productive of a permanent cure The Ohio State group has done emergency splenectomies in individuals with "hemoclastic crisis" and this has often resulted in a sudden spectacular release of red cells following ligation of the splenic pedicle while the patient is still on the operating table Doan and his associates make much of a hypothetical "hemolytopoietic equilibrium" which exists between the blood forming and blood destroying organs and are inclined to un-

deficiency) type is present as an idiopathic disorder, or as a hypersensitive or toxic reaction to certain drugs or as a symptom of some such destructive process in the marrow as leukemia or metastatic malignancy or of aplasia of the marrow, as in benzol poisoning, and so forth. The importance of drugs as causative agents in certain cases of "idiopathic" purpura hemorrhagica is just being appreciated. A few years ago, 'sedormid' was definitely implicated as the cause of 3 cases of purpura (see F E Loewy, *Lancet* 1 845 [April 21] 1934), and the author indicated that certain patients might be hypersensitive to the drug. The reviewer has had occasion recently to study some interesting cases of drug hypersensitivity with symptomatic thrombocytopenic purpura. It thus becomes apparent, first, that the more we study idiopathic disorders, the less idiopathic do they become, and, secondly, that hypersensitivity to drugs may result not only in general reactions but in skin eruptions and such bone-marrow reactions as aggranulocytosis and thrombocytopenic purpura. W S Middleton and O O Meyer (*Ann Int Med* 8 1575 [June] 1935) bring out that the same drug may cause either complete marrow insufficiency (aplastic anemia), leukemia or thrombocytopenia. This is true particularly of gold and arsenical compounds. E H Hudson (*Lancet* 2 74 [July 13] 1935) reports 2 cases of thrombocytopenic purpura caused by administration of gold and arsenical compounds and conclude that an idiosyncrasy or abnormal sensitivity on the part of the patient is the probable cause.

**Treatment** S M Peck and N Rosenthal (*J A M A* 104 1066 [Mar 30] 1935) describe the effect of moccasin snake venom in the treatment of hemorrhagic conditions. Snake venom in ordinary dosage causes hemorrhage by capillary rupture, if this material is given in gradually ascending doses, beginning with 0.4 cc of a 1:3000 solution, the capillaries become refractory to the "Schwartzman phenomenon." The injections are given, as a rule, twice weekly subcutaneously, 0.8 cc being the maximum dose. With marked bleeding, the period between injections is shortened. Treatment is continued for 2 to 3 months, and if the patient has shown a good response, the interval between injections is lengthened. In children, the minimum dose is 0.2 cc (3 minims) of the 1:3000 solution, the maximum dose 0.6 cc (10 minims). Ecchymotic reactions are common and most of the patients become hypersensitive to the material. This necessitates desensitization and injections are again given twice weekly beginning with 0.1 cc (1½ minims) of a 1:10,000 solution. All types of hemorrhagic disorders were treated: idiopathic nasal bleeding, functional uterine bleeding, nonthrombocytopenic pur-

purpura, thrombocytopenic purpura, bleeding in association with hereditary hemorrhagic telangiectasis and hemophilia. There was great improvement in most of the cases, although no improvement took place in hemophilia or in leukemia. H M Greenwald (*Am J Dis Child* 49 347 [Feb] 1935) states that of 8 cases of thrombocytopenic purpura treated with splenectomy and repeated transfusions from 1928 to 1932, two died of cerebral hemorrhage and one of postoperative shock. In 3 recent cases treated with moccasin snake venom, the bleeding stopped in each case after the third or fourth injection, and the bleeding time became reduced. The blood platelets also were increased. (Although these results seem at first glance to be remarkably good, they have yet to stand the test of time and of critical appraisal.)

#### POLYCYTHEMIA

The arbitrary distinction between polycythemia "vera" and secondary polycythemia may be more apparent than real and of no greater moment than that between "primary" and "secondary" anemia. All cases of anemia are secondary to some cause, and it may well be that the same holds true for polycythemia. Paul Reznikoff, N C Foot, and J M Bethea (*Am J M Sc* 189 753 [June] 1935) make some observations regarding the etiologic and pathologic factors in polycythemia vera. They found that of 134 patients with the disease, 48 per cent were Jews born in Eastern Europe. (The average incidence of this group in the 6 hospitals studied was under 10 per cent.) Since this racial incidence was roughly similar to that in thromboangitis obliterans, study of the blood vessels of the bone-marrow was considered important. In all of the polycythemia vera cases studied there was distinct thickening of the capillary walls due to fibrosis of the subintimal and adventitial layers. In an early case of the disease marked inflammatory and necrotic lesions were seen along the course of the blood vessels in the marrow. There was "frequent" association of polycythemia vera with thromboangitis obliterans. Reznikoff and his associates speculate whether the vascular defect in the marrow may not cause an anoxic state, with resultant compensatory increased red cell production. (It should be mentioned that at the present state of knowledge, it is difficult to state definitely whether the vascular lesions of the bone-marrow are the primary condition or whether they are secondary to continued distention of blood vessels with an increased volume of blood.)

The vascular lesions in polycythemia vera are indeed striking and one of the most striking of these is the frequency of thrombotic manifestations. R Jürgens and K Bach (*Deutsches*



tained although the essentials of the theory and the manner of its workings are the subjects of much discussion. This theory contends that thrombin is formed from precursors (prothrombin, calcium, a tissue factor). In the presence of thrombin, fibrinogen is converted to fibrin. A factor inhibiting coagulation may also be present in the circulating blood.

**Hemophilia Etiology** Much continues to be written about this mysterious hereditary disease. R. P. Custer and E. B. Krumbhaar (*Am J M Sc* 189 620 [May] 1935) describe the histopathology of the bone-marrow in hemophilia, rightly regarded by them as "an unexplored field." The red and white cells of the marrow in their 3 cases were within normal limits but the thrombocyte series was definitely abnormal in that younger forms of megakaryoblasts were present in increased numbers together with an increased number of megakaryocytes. Thus, the authors felt, indicated a relation of the blood platelets to the hemophilic process. A. J. Quick, M. Stanley-Brown, and F. W. Bancroft (*Ibid* 190 501 [Oct] 1935) studied the coagulation defect in the disease. They state that only 4 constituents are essential for clotting: prothrombin, thromboplastin, calcium, and fibrinogen. It should theoretically be possible to determine which of these constituents is at fault. Previous studies have demonstrated that there is probably no defect in the thromboplastin, fibrinogen, or calcium. The above authors failed to find, however, any defect in the fourth factor, prothrombin, despite their development of a new test. The mystery of why hemophilic blood does not clot must still remain obscure.\* R. S. Handley and A. M. Nussbrecher (*Quart J Med* 4 165 [Apr] 1935) present 3 cases of hereditary bleeding in women, in which all the features of hemophilia were present. Whether "pseudohemophilia" was present or whether these cases were examples of true hemophilia in homozygous females is debatable.

**Treatment** Completely negative results continue to be obtained with the administration of various types of female sex hormone in the treatment of hemophilia. Thus, what seemed to be a spectacular advance in the treatment of this disease has proved a fiasco. These negative results are discussed in a careful study by W. B. Chew, R. P. Stetson, G. V. Smith, and O. W. Smith (*Arch Int Med* 55 431 [Mar] 1935), who found, however, a possible adverse factor to blood clotting in hemophilia in a gonad-stimulating hormone of the anterior pituitary gland. Single case reports continue to give what purport to be good results in severe cases of hemophilia, viz., the case of K. Franke and S.

Litzner (*Med Klin* 31 520 [Apr 18] 1935). These authors gave 100 units of an ovarian hormone preparation intravenously to a desperately ill patient with good results. H. W. Jones and L. M. Tocantins (*J A M A* 103 1671 [Dec 1] 1934) discuss the various methods of treatment in hemophilia and conclude that the intravenous transfusion of unmodified blood constitutes the best method for the prevention and treatment of acute attacks of bleeding; citrated blood, they feel, causes more frequent reactions. Intramuscular injection of 20 cc of whole blood has appeared to benefit some patients. Fresh serum is a satisfactory local hemostatic agent. As regards other methods of treatment, S. M. Peck and N. Rosenthal (*J A M A* 104 1066 [Mar 30] 1935) found that moccasin snake venom was of no value in 3 cases of hemophilia. O. Ressler (*Klin Wchnsch* 14 958 [July 6] 1935) found that apple pectins reduced the clotting time of normal rabbit's blood and suggested their use in human beings. C. P. Waldorp and A. G. Alvarez (*Semana med* 1 6 [Jan 3] 1935) tried to reduce the clotting time in their cases of hemophilia by aolan, calcium chloride, 30 per cent sodium citrate solution, electrargol, liver extract, 20 per cent solution of sodium hyposulfite, horse serum, injectable amino acids, high vitamin diets, ovarian preparations, and so forth, without any effect whatever. The only substance they found to be of any value was a 1 per cent solution of Congo red, 1 cc for every 8 to 10 kg of body-weight. This substance seemed to be of great value in the treatment of hemophilic accidents, particularly in the joint cases.

**Purpura Types and Etiology** There are, broadly speaking, 2 types of purpura: (1) a type in which the blood platelets are normal but the capillaries are defective (nonthrombocytopenic purpura), and (2) a type in which the platelets are strikingly deficient, the capillary walls being normal (thrombocytopenic purpura). The former type is undoubtedly much more common, being associated with serum sickness, infections of various types, snake bites, senility, and so forth. In women, the reviewer has noticed its frequent association with the menstrual period. The hemorrhagic state in association with chronic nephritis with uremia is interesting and is discussed by A. Gualdi (*Policlinico* 42 136 [Mar] 1935). The purpura of uremia is in all probability "toxic" in type, being associated with humoral changes of a physicochemical nature originating in complete insufficiency of the kidney and partial insufficiency of the liver. Gualdi states that the hemorrhagic manifestations of the skin or mucous membranes are not seen in chronic nephritis unless chronic uremia is present.

Purpura of the thrombocytopenic (platelet

\*Part of this mystery has been dispelled in some interesting recent work by A. J. Patek, Jr. and R. P. Stetson (*J Clin. Investigation* 15:531 Sept 1936) who found that normal plasma contains a substance lacking from the plasma of hemophiliacs.



deficiency) type is present as an idiopathic disorder, or as a hypersensitive or toxic reaction to certain drugs or as a symptom of some such destructive process in the marrow as leukemia or metastatic malignancy or of aplasia of the marrow, as in benzol poisoning, and so forth. The importance of drugs as causative agents in certain cases of "idiopathic" purpura hemorrhagica is just being appreciated. A few years ago, "sedormid" was definitely implicated as the cause of 3 cases of purpura (see F. E. Loewy, *Lancet* 1 845 [April 21] 1934), and the author indicated that certain patients might be hypersensitive to the drug. The reviewer has had occasion recently to study some interesting cases of drug hypersensitivity with symptomatic thrombocytopenic purpura. It thus becomes apparent, first, that the more we study idiopathic disorders, the less idiopathic do they become, and, secondly, that hypersensitivity to drugs may result not only in general reactions, but in skin eruptions and such bone-marrow reactions as agranulocytosis and thrombocytopenic purpura. W. S. Middleton and O. O. Meyer (*Ann Int Med* 8 1575 [June] 1935) bring out that the same drug may cause either complete marrow insufficiency (aplastic anemia), leukemia, or thrombocytopenia. This is true particularly of gold and arsenical compounds. E. H. Hudson (*Lancet* 2 74 [July 13] 1935) reports 2 cases of thrombocytopenic purpura caused by administration of gold and arsenical compounds and conclude that an idiosyncrasy or abnormal sensitivity on the part of the patient is the probable cause.

**Treatment.** S. M. Peck and N. Rosenthal (*J A M A* 104 1066 [Mar 30] 1935) describe the effect of moccasin snake venom in the treatment of hemorrhagic conditions. Snake venom in ordinary dosage causes hemorrhage by capillary rupture, if this material is given in gradually ascending doses, beginning with 0.4 cc of a 1:3000 solution, the capillaries become refractory to the "Schwartzman phenomenon." The injections are given, as a rule, twice weekly subcutaneously, 0.8 cc being the maximum dose. With marked bleeding the period between injections is shortened. Treatment is continued for 2 to 3 months and if the patient has shown a good response, the interval between injections is lengthened. In children, the minimum dose is 0.2 cc (3 minims) of the 1:3000 solution, the maximum dose 0.6 cc (10 minims). Ecbymotic reactions are common and most of the patients become hypersensitive to the material. This necessitates desensitization and injections are again given twice weekly beginning with 0.1 cc (1½ minims) of a 1:10,000 solution. All types of hemorrhagic disorders were treated: idiopathic nasal bleeding, functional uterine bleeding, nonthrombocytopenic pur-

pura, thrombocytopenic purpura, bleeding in association with hereditary hemorrhagic telangiectasis and hemophilia. There was great improvement in most of the cases, although no improvement took place in hemophilia or in leukemia. H. M. Greenwald (*Am J Dis Child* 49 347 [Feb.] 1935) states that of 8 cases of thrombocytopenic purpura treated with splenectomy and repeated transfusions from 1928 to 1932, two died of cerebral hemorrhage and one of postoperative shock. In 3 recent cases treated with moccasin snake venom, the bleeding stopped in each case after the third or fourth injection, and the bleeding time became reduced. The blood platelets also were increased. (Although these results seem at first glance to be remarkably good, they have yet to stand the test of time and of critical appraisal.)

#### POLYCYTHEMIA

The arbitrary distinction between polycythemia "vera" and secondary polycythemia may be more apparent than real and of no greater moment than that between "primary" and "secondary" anemia. All cases of anemia are secondary to some cause, and it may well be that the same holds true for polycythemia. Paul Reznikoff, N. C. Foot, and J. M. Bethea (*Am J M Sc* 189 753 [June] 1935) make some observations regarding the etiologic and pathologic factors in polycythemia vera. They found that of 134 patients with the disease 48 per cent were Jews born in Eastern Europe. (The average incidence of this group in the 6 hospitals studied was under 10 per cent.) Since this racial incidence was roughly similar to that in thromboangitis obliterans, study of the blood vessels of the bone-marrow was considered important. In all of the polycythemia vera cases studied there was distinct thickening of the capillary walls due to fibrosis of the subintimal and adventitial layers. In an early case of the disease marked inflammatory and necrotic lesions were seen along the course of the blood vessels in the marrow. There was frequent association of polycythemia vera with thromboangitis obliterans. Reznikoff and his associates speculate whether the vascular defect in the marrow may not cause an anoxic state, with resultant compensatory increased red cell production. (It should be mentioned that at the present state of knowledge, it is difficult to state definitely whether the vascular lesions of the bone-marrow are the primary condition or whether they are secondary to continued distention of blood vessels with an increased volume of blood.)

The vascular lesions in polycythemia vera are indeed striking and one of the most striking of these is the frequency of thrombotic manifestations. R. Jurgens and K. Bach (*Deutsches*

*Arch f klin Med* 176 626 [Aug] 1934) observed 7 cases of polycythemia of which 3 presented thrombosis. The patients with thrombosis showed increase in blood platelets, shortening of the bleeding time and an increase in the blood fibrinogen and globulin. These findings were absent in the 4 cases free from thrombotic manifestations.

**Treatment** Treatment is eminently unsatisfactory. Venesections, x-ray therapy to the bones, and phenylhydrazine or acetylphenylhydrazine hydrochloride are all being used and each has its adherents. M. Sgalitzer (*Wien klin Wchnsch* 48 675 [May 18] 1935) tried x-ray irradiation of the entire body, using somewhat larger doses than are employed in leukemia. Daily dosage of about 25 roentgens is given for 1 week, after which the blood is examined with particular reference to the leukocyte count. It is dangerous to continue irradiation with a white count lower than 3000 per cu mm. If the leukocyte count is maintained, the irradiation is continued. Reactions to the treatment vary considerably. Relapses occur in from 18 months to 5 years. A very interesting method is that proposed by F. Reimann and A. Bieuer (*Ztschr f klin Med* 128 238, 1935), who produced what amounts to hypochromic (non deficient) anemia in their 7 cases by removing 300 to 400 cc of blood twice weekly. Diminution in the iron stores of the blood resulted in diminution in erythropoiesis and thus in a remission of the disease which lasted for several months to 2 years. They compare this method of treatment with x-ray irradiation and the administration of phenylhydrazine. X-ray irradiation, they feel, is dangerous on account of the extraordinarily high dosage which must be given, with phenylhydrazine the marrow becomes stimulated and the treatment must be continuously applied and the patient constantly followed because of the danger of poisoning.

#### AGRANULOCYTOSIS

**Etiology** Paper after paper continues to present evidence indicating the importance of the role of drugs, particularly amidopyrine, in the etiology of agranulocytosis. H. Jackson, Jr. and F. Parker, Jr. (*New Eng J Med* 212 137 [Jan 24] 1935) doubt a good deal of the evidence which has been advanced regarding this relation. In a previous paper, H. Jackson, Jr. (*Am J M Sc* 188 482 [Oct] 1934) states that in 74 per cent of his cases, drugs had either no causative relation to the disease or had not even been used by the patient prior to the attack. This view is not, however, concurred in by the great majority of observers. T. Fitz-Hugh, Jr. (*M Clin North America* 19 103 [July] 1935) discusses the question of etiology carefully and concludes that amidopyrine is a

most important factor, producing the disorder by way of some, as yet unexplained, idiosyncrasy mechanism. He feels that since "amidopyrine is a drug of no outstanding value, its use should be discontinued until further evidence is at hand." Despite the feeling of most observers that the affected individuals must be in some way hypersensitive to the drug, most of the various tests for hypersensitivity have been negative, although T. L. Squier and F. W. Madison (*Wisconsin M J* 34 175 [Mar] 1935) report positive "patch" tests to amidopyrine in 2 of their recovered patients. Recently the reviewer (W. Dameshek and A. Colmes *J Clin. Investigation* 15 85 [Jan] 1936) has obtained strikingly positive tests to the intradermal administration of amidopyrine after it had been allowed to come in contact with blood serum for several days. Tests with amidopyrine alone and with blood serum alone were negative. This suggests—following the observations of Landsteiner—drug protein linkage with the formation of a new sensitizing antigen. In the above experiments, the disease was induced in 2 recovered patients by the above intradermal tests, in which only a few milligrams of the drug had been introduced. F. T. Hunter (*New Eng J Med* 213 663 [Oct 3] 1935) from a study of the literature comes to the conclusion that certain individuals are unusually sensitive to various drugs, the sensitivity becoming expressed in the clinical picture of agranulocytosis. The drugs which have been most frequently associated with the development of the disease have been amidopyrine, drugs containing amidopyrine, and dinitrophenol. The devastating effects of the latter drug, not only in the production of agranulocytosis but in other serious conditions, are just coming to light.

**Pathology** H. Jackson, Jr. and F. Parker, Jr. (loc cit) discuss the very variable descriptions of the bone marrow given by various authors. In Jackson's experience of 25 typical cases dying of the disease, the marrow was found to have either a normal or increased cellularity. There was no disturbance in either erythropoietic or megakaryocytic formation, but marked changes were present in the cells of the granular series. No mature granulocytes were found and practically every cell was decidedly immature. In those cases surviving the disease for from 8 to 20 days, many lymphocytes and plasma cells were found. Jackson and Parker are inclined to agree with the view of Fitz-Hugh and Krumbhaar that the marrow in these cases indicates a "maturation arrest" of myeloblastic cells.

R. P. Custer (*Am J M Sc* 189 507 [April] 1935) makes much the same observations. In 9 of 11 cases studied at autopsy, uniform appearances were present proliferation of myeloblasts with "maturation arrest" so that only

few myelocytes and mature granulocytes were present, a normal or even slightly increased red cell formation, and infiltration of lymphocytes.

It is possible at the present time to build up a fairly consistent line of physiologic reasoning which explains the sequence of events in agranulocytosis: a certain few people are extremely sensitive ("allergic") to such drugs as amidopyrine, the bone-marrow becomes suddenly involved in a specific manner and there is a paralysis of maturation of cells of the granulocytic series, the granulocytes disappear from the blood, in a few days, secondary bacterial invaders appear and the clinical picture of agranulocytosis is present. Treatment with nucleic acid derivatives might have a direct effect in the development of normal maturation of the cells.

**Treatment.** Jackson and Parker (loc cit) state that, although many measures have been advocated to combat agranulocytosis, none are specific. Nonspecific therapy (injection of whole milk, and so forth), transfusion of blood, stimulating doses of x-ray, liver extract, and certain derivatives of nucleic acid have been advocated. These authors feel that the patient has the best chance with a mixture of pentose nucleotides (pentnucleotide). Of 103 patients treated with this drug, which is given intramuscularly twice or three times daily in doses of 10 cc, 69 or 67 per cent recovered and were alive at the time of writing. The mortality prior to the introduction of the drug had been about 75 to 90 per cent. The reviewer feels that a more simple derivative of nucleic acid (that is adenine sulfate) which is given intravenously in dosage of 1.0 gm (15 grains) is somewhat more active and more free of reactions.

#### GLANDULAR FEVER (INFECTIOUS MONONUCLEOSIS)

This is probably one of the most commonly overlooked diseases in general practice. It is usually called "grippe" since it presents itself with fever, headache and sore throat. Glands not ordinarily being looked for are frequently missed. The diagnosis should be suspected in a youngish individual who has an irregular, rather slight fever which tends to remit at intervals and who complains of headache, some sore throat, at times even of abdominal pain. H. L. Tidy (*Lancet* 2 180 [July 28] 1934), C. A. McKinlay (*J. A. M. A.* 105: 761 [Sept 7] 1935), and B. K. Wiseman (*Cyclopedia of Medicine* Revision Service, 13: 151 1936) present the various clinical features. An interesting symptom is severe abdominal pain, presumably due to enlarged mesenteric glands, and often misdiagnosed as appendicitis. The superficial lymph nodes are always enlarged, especially those of the upper cervical, submaxillary and suboccipital areas. It is curious but none the less true that in almost every case the left-sided

cervicals and supraclaviculars are much more prominent than those on the right. The diagnosis is made in most cases by physical examination alone which shows an individual with fever, general lymph node enlargement, yet who does not appear at all ill. There is no anemia and no bleeding as seen in acute leukemia. Diagnosis is made positive by examination of the blood smear which shows extreme lymphocytosis, the lymphocytes being of many types: large, extremely large, those with indented nuclei, with heavy blue cytoplasm and so forth. The bizarre blood picture is quite in contrast with that seen in acute leukemia in which a monotonous blood picture is quite the rule. Wiseman states (loc cit) supravital preparations are superior to the ordinary stained smears because certain characteristics of nucleus and cytoplasm are lost in the latter. H. Downey and J. Stasney (*J. A. M. A.* 105: 764 [Sept 7] 1935) and C. A. Stuart, A. M. Burgess, H. A. Lawson, and H. W. Wellman (*Arch. Int. Med.* 54: 199 1934) describe the lymphocytes accurately. In the reviewer's hands, diagnosis from the stained blood smear alone has proved entirely satisfactory, and the heterophile agglutination test has proved more of scientific interest than a diagnostic help. The test does not seem to be positive in every typical case, it is of course, satisfying (as absolutely ruling out leukemia) to obtain a strongly positive test. In recent articles by Stuart, Burgess, Lawson, and Wellman (loc cit), C. A. Stuart, J. Tallman and E. Brintzenhoff (*J. Immunol.* 28: 85 [Feb] 1935), G. H. Bailey and S. Raffel (*J. Clin. Investigation* 14: 228 [March] 1935) and others in which is discussed the theoretical significance of the agglutination phenomenon, no hint has as yet been obtained regarding its cause. It is likely that from it will some day come information about the etiology of the disease. In this regard, Bailey and Raffel (*J. Clin. Investigation* loc cit) state that the agglutination reaction is probably the specific response to an antigen having a factor in common with a thermostable component of sheep and ox red cells: a certain strain of *B. Welchii*, and possibly horse kidney. E. M. Butt and A. G. Foord (*J. Lab. & Clin. Med.* 20: 538 [Feb] 1935) suggest a quick microscopic test by using one loopful of blood serum to be tested mixed with 4 loopfuls of a 2 per cent suspension of sheep's red cells in a hanging drop preparation. In blood from infectious mononucleosis almost immediate agglutination takes place. Some cases are associated with severe fusospirochetal infections (Vincent's angina) and for these, as suggested by Wiseman (loc cit) peroxide gargles and one or two intravenous injections of neosphenamine hasten healing. Most cases, however, require nothing but symptomatic treatment. A feeling of "lack of pep" may persist for a month

to several months after fever and lymphadenopathy have subsided. The blood picture gradually returns to normal within 2 or 3 months, it is well to know that a second infection occurring within a year may be associated with lymphocytosis.

#### LEUKEMIA

The case reports concerning leukemia bulk large in hematologic literature and every year one seems to see more and more cases. Yet the outlook remains just as tragic as ever. Most investigators feel that the disease represents a highly malignant generalized neoplastic condition of one of the three blood-forming organs: the bone-marrow, the lymphoid system, and the reticulo-endothelial system. It is very likely that the localized neoplasms of these organs (chloroma, lymphomata, reticuloma, and so forth) are very closely related to the leukemic, or generalized conditions. The malignant character of leukemia and its relation to localized neoplasms are well brought out in an experimental study in rats by J. Furth (*J. Exper. Med.* 61:423 [March] 1935). An emulsion of spleen from a mouse dying of myeloid leukemia when injected into other mice at times produced leukemia, at times tumors, and at times a combination of tumor and leukemia. The type of condition which developed was dependent upon the route of entry, the resistance of the host and the character of the cells injected. Both "acute" and "chronic" types of leukemia developed. Furth felt that to classify leukemia into acute and chronic varieties was arbitrary, since they both were the same disease with different growth tendencies. What starts off the irreversible leukemic process is not known. Some hint might be obtained from those cases of leukemia which occur in workers exposed to much x-radiation. In a very interesting (Belgian) letter in the *J. A. M. A.* (104:1921 [May 25] 1935) the remarks of Dr. Maisin to the Belgian Society of Radiology anent the morphologic changes in the blood of radiologists are reported. According to the correspondent, Maisin states that 25 per cent of radiologists are affected with lymphoid leukemia (!). Two Belgian radiologists are said to have died of leukemia. Maisin states further that close regard to protection from the x-rays is imperative, particularly in therapy. L. F. Craver (*J. A. M. A.* 105:1820 [Dec. 7] 1935) in discussing the etiology of cancer refers to work by several authors concerning the development of various types of blood cell tumors and leukemia in mice following injections of such chemicals as indole, tar, and so forth.

The diagnosis of leukemia can either be the easiest thing in the world or the hardest. With the blood filled with large numbers of cells, almost all immature, the diagnosis should be made

in every instance, whether or not the exact type of cell—myeloblast, lymphoblast, or monocyte—is differentiated. In the presence of a normal or even a low white cell count and anemia (at least one-half the cases present these features) the diagnosis may be more difficult. N. Rosenthal and W. Harris (*J. A. M. A.* 104:702 [March 2] 1935) discuss the difficulties in diagnosis from a review of 455 cases seen over a period of years. The important characteristic feature, they feel, is the persistent relative or absolute increase in number of mature or immature white cells. R. R. Kracke and H. Garver (*J. A. M. A.* 104:697 [March 2] 1935) emphasize the importance of recognizing the immature cells in the disease as well as the macrocytosis of the red cells which at times causes confusion with pernicious anemia. In children, particularly, the diagnosis may often be very difficult as brought out by A. F. Abt (*Pennsylvania M. J.* 38:389 [March] 1935) since leukemia may be confused with such totally different conditions as diphtheria, scurvy, endocarditis rheumatic fever, von Jaksch anemia, Cooley's anemia, and so forth. What strikes the reviewer in seeing these cases is the blind faith so often placed by physicians in the hematologic reports of technicians. (This illustrates again the power of the written word, particularly on a laboratory report. With few exceptions technicians seem to call all types of cells with deep blue cytoplasm "lymphocytes" or "large mononuclears" whether they are lymphoblasts, myeloblasts or histiocytes.)

Interest in monocytic leukemia continues intense as these cases are more readily recognized. Good articles are contributed by V. Levine (*Folia haemat.* 52:305, 1934), L. E. H. Whitby and J. M. Christie (*Lancet* 1:80 [Jan. 12] 1935), and C. A. Doan and B. K. Wiseman (*Ann. Int. Med.* 8:383 [Oct.] 1934). All of these authors agree that this type of leukemia is probably much more frequent than has heretofore been suspected. R. Isaacs (*The Cyclopaedia of Medicine, Revision Service*, 13:153, 1936) cites various other types of leukemia which have been discriminated: plasma cell, eosinophilic, and megakaryoblastic.

The neurologic changes which occur in leukemia are often quite interesting and have been analyzed by R. S. Schwab and S. Weiss (*Am. J. M. Sc.* 189:766 [June] 1935). I. Goldstein and D. Wexler (*Arch. Ophth.* 13:26 [Jan.] 1935) studied the fundus oculi carefully in eleven cases. In most cases, the changes are minimal, in an exceptional case quite striking. In the reviewer's experience, the most marked changes occur in acute lymphatic leukemia when the retina may often be seen to be thick, edematous, and shiny. The bone changes in leukemia have been the subject of several articles. H. P. Doub and F. W. Hartman (*J. A. M. A.* 105:942

[Sept 21] 1935) contribute a comprehensive article "Moth-eaten" areas in the bones on the x-ray plate together with pin-point areas of decalcification in the flat bones are suggestive of myeloid or lymphatic types. L. F. Craver and M. M. Copeland (*Arch Surg* 30 639 [April] 1935) found bone changes in about 7 per cent of 86 cases of lymphatic leukemia, in only 1 of 84 cases of myelogenous leukemia. Children are especially prone to bone changes as noted by C. E. Snelling and A. Brown (*Arch Dis Childhood* 9 315 [Oct] 1934) who found changes in 8 of 12 cases.

Very little advance has been made in treatment of this dreaded disease. Isaacs (loc cit) analyzes the 3 main types of therapy used: x-ray, transfusion of blood, and arsenic. This investigator advocates the minimum number ( $\pm$  or less) of doses that are necessary to produce the desired result. He states that small repeated doses shorten the remissions and hasten the period in which most of the cells appear in the blast stages. H. Langer (*Am J Roentgenol* 34 214 [Aug] 1935) advocates treatment over the spinal column in order that the paravertebral ganglia might be irradiated and thus depress a (highly speculative) overactive sympathetic nervous system. The latter system has been previously related to leukemia. Friedgood some years ago found reduction in basal metabolic rate and in white cell count following Lugol's solution—this was interpreted as a possible action on an overactive sympathetic nervous system. W. Dameshek, D. D. Berlin and H. L. Blumgart (*New Eng J Med* 210 723 [April 5] 1934) more recently performed thyroidectomy in a case of chronic lymphatic leukemia with extreme hypermetabolism with excellent results\*. M. C. G. Israëls (*Brit M J* 1 1021 [May 18] 1935) treated five cases of chronic lymphatic leukemia, first with Lugol's solution then with x-rays. He concluded there was no relation between lymphatic leukemia and hypermetabolism and therefore thyroidectomy was not at present justified. N. Rosenthal and W. Harris (loc cit) state that radiotherapy is of most value in chronic myeloid and lymphoid leukemia although results were temporary and resistance apt to develop. In contradistinction to most writers, Rosenthal and Harris feel that radiotherapy is justified in acute leukemia.

#### NEOPLASMS OF THE WHITE CELLS

An excellent article on "Lymphatic Myelocytic and Monocytic Neoplasms" by H. P. Doub and F. W. Hartman (loc cit) gives most of the recent concepts regarding these diseases with especial reference to roentgen diagnosis and treatment. Here are presented cases of lymphosarcoma terminating as lymphatic leu-

kemia, chloroma (myelosarcoma) and Hodgkin's disease. Callender's classification referred to in last year's review is also utilized by Doub and Hartman. There are three types of white cells (granulocytes, lymphocytes, monocytes) derived from the three blood-forming organs (bone-marrow, lymphoid tissue, and reticulo-endothelial system) and which are subject to either general or local proliferation. General proliferation is leukemia, local proliferation results in a tumor. There are bone-marrow, lymphoid, and reticuloendothelial tumors. These may be highly malignant (sarcoma) or only slightly malignant. Gradations in types of malignancy are frequently seen. An incomplete list of these tumors is as follows:

Bone-Marrow	Myelosarcoma (Chloroma)	Myeloma
Lymphoid Tissue	Lymphosarcoma	Lymphoma , Plasmacytoma (Multiple Myeloma)
Reticulo- Endothelial Tissue	Reticulum Cell Sarcoma	Reticulo- endothelioma
Hodgkin's Disease		

It is noted from this list that "multiple myeloma" is a misnomer, and it is in reality a tumor of lymphoid cells (plasma cells) which, like most blood cell tumors, tend to invade bone. It is also noted that Hodgkin's disease is included among the reticulo-endothelial tumors, where many pathologists now place it. Regarding Hodgkin's disease, Edith L. Potter (*Arch Path* 19 139 [Feb] 1935) states there is a proliferation of reticulum cells along both normal and abnormal lines. Some of the abnormal cells develop into typical "Hodgkin" cells which are very large with basket-shaped nuclei either single or multiple in type. According to Potter, Hodgkin cells are never found except in Hodgkin's disease. A good deal of attention is being paid to "multiple myeloma" (plasmacytoma) and more particularly to the changes in the blood protein which occur in association with it. A. G. Foord (*Ann Int Med* 8 1071 [March] 1935) found marked hyperproteinemia in 3 of 4 cases together with autohemagglutination of the red cells. It is remarked that the findings of either a very high blood protein or of marked rouleaux formation of the red cells either in smears or in hemocytometers should make one suspect the presence of the disease. Helene Bürkel (*Ztschr f klin Med* 127 552, 1934) demonstrates that in various diffuse and localized disturbances of the bone-marrow, the blood protein values do not deviate greatly from the normal. Hyperproteinemia is seen only in "myeloma", although it does not occur in every instance of the disorder.

\* This patient is still alive and well after 3 years. One year after striking improvement had occurred all of the symptoms and signs were reinduced by large doses of thyroid.

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 22471

### PRESENTATION OF CASE

A 52 year old French Negress was admitted complaining of cough and dyspnea. The patient's son, who is 18 years old, stated that her age was nearer 35 than the given age of 52 years.

About one and a half years before entry the patient began to feel run down and was readily fatigued. At this time she had an attack of pneumonia which confined her to bed for 4 weeks. There was cough and fever of 102° to 103° with chilly sensations and rusty sputum. The cough gradually subsided and the temperature became normal. Six months later she had another attack of pneumonia and subsequently developed a dry hacking cough accompanied by a sore throat, which persisted for 2 or 3 weeks. There was no associated fever. The cough occurred only a few times a day and was usually excited by exertion or talking. During the 3 months preceding entry the cough became progressively worse and occurred in paroxysms often lasting as long as 6 to 10 hours. The cough was generally unproductive but occasionally in the morning she raised as much as one half to a cupful of creamy material which was occasionally blood streaked. Thus she stated came from the throat rather than the lungs. During particularly severe paroxysms the right side of her neck swelled and became firm. This was both palpable and visible to the patient and disappeared directly after cessation of the cough. Dyspnea appeared as the severity of the cough increased and the patient complained of inability to get enough air into her chest. For six months before admission she required two pillows in order to rest comfortably at night. More recently it was necessary for her to sit bolt upright with her head in her hands throughout the night. Throughout the illness the patient noted swelling of her feet and legs up to the knees which increased in severity during the last 3 or 4 months. This swelling was worse at night and was relieved by bed rest. The patient complained that she had insufficient funds

for adequate food and often went for 1 or 2 days without eating. Her appetite, however, was unimpaired.

Three years before entry because of poor finances the patient had insufficient food and her weight decreased from 150 to 120 lbs in 3 months. She went to a sanatorium where she remained for 4 months, 1 month of which was spent in bed. For 5 or 6 years she had fleeting sharp pains over the precordium about two or three times a year. This usually occurred following moderate exertion. Occasionally pain radiated along the inner aspect of the left arm to the elbow. Eighteen years ago she had double pneumonia with pleurisy.

Physical examination showed a well-developed and nourished orthopneic Negress. The mucous membranes were somewhat pallid. Oral hygiene was poor and the throat was negative. Several small nodes were palpable at the angles of the jaw. The heart was slightly enlarged to the right, the right border of dulness being 3 centimeters from the midsternal line. The sounds were regular and P<sub>2</sub> was greater than A<sub>2</sub>. A soft blowing systolic murmur was audible in the aortic area and a similar murmur was audible at the apex. No diastolic murmurs were heard. A few scattered rales were audible at both bases but the lungs were otherwise clear. The blood pressure was 110/80. The liver extended two fingerbreadths beneath the costal margin and was slightly tender. The abdomen was otherwise negative. There was pitting edema of the feet and legs, more marked on the right. The patient was menstruating and a pelvic examination was not done.

The temperature was 99°, the pulse 90. The respirations were 20.

Examination of the urine showed a specific gravity of 1.005 with a slight trace of albumin. The sediment was negative. The blood showed a red cell count of 4,000,000, with a hemoglobin of 75 per cent. The white cell count was 5,500, 61 per cent polymorphonuclears. The sputum showed no tubercle bacilli. Stool examinations were negative. A Hinton test was negative. The nonprotein nitrogen of the blood was 33 milligrams. The serum protein was 4.6 grams, and the cholesterol 148 milligrams. The sedimentation rate was 0.1 millimeters per minute. An electrocardiogram showed a tendency toward right axis deviation. T<sub>1</sub> was low and T<sub>2</sub> and T<sub>3</sub> inverted. S-T<sub>4</sub> was flat and T<sub>4</sub> was small and diphasic. A phenolsulphonephthalein test showed 60 per cent excretion of dye.

X-ray examination showed that the heart was slightly increased in the transverse diameter. Both hilar shadows were increased in size, apparently due to enlargement of the pulmonary vessels. The lung fields and costophrenic angles were clear.

The patient was treated palliatively by bed rest, salyrgan, and small doses of digitalis. She improved gradually and during the third hospital week two basal metabolic rates were —17 and —8. Throughout the hospital stay, except for occasional rises to 100°, her temperature remained normal. The edema disappeared but recurred to a slight degree when the patient arose from bed. She was discharged improved on the fifty-eighth hospital day.

#### *Second Admission, one week after discharge*

The patient had refused sanatorium care and returned to the home of a friend. Here she felt well, was able to get up and about but still continued to have some dyspnea and slight puffiness of the dorsa of both feet. Three days before reentry, shortly after drinking a glass of water, she had dull, steady, nonradiating epigastric pain which continued until admission. There was some nausea and the water ingested was vomited. She vomited repeatedly following any attempt to eat or drink. Dyspnea recurred and progressed rapidly to orthopnea and the edema of the lower extremities became pronounced. On the day before entry she took a train to Boston and upon arrival appeared so ill that she was immediately admitted to the Emergency Ward.

Physical examination showed the patient to be markedly orthopneic and the lips were slightly cyanotic. The heart showed no change in size but a loud blowing precordial systolic murmur was heard best at the left third and fourth interspace. The sounds were regular and of good quality. The blood pressure was 100/60. A few basal rales were heard in the lungs and the liver extended down about two or three fingerbreadths. There was pitting edema of the legs up to the knees.

Examination of the urine showed a slight trace of albumin and the sediment was loaded with white blood cells. The blood showed a white cell count of 9,000.

On the morning following entry she called for help. When the nurse arrived the patient was pulseless and unconscious. She was pronounced dead 5 minutes later.

#### DIFFERENTIAL DIAGNOSIS

DR HOWARD B. SPRAGUE. I think one should approach this case by asking first the question—did this patient have primary cardiac disease? There seems to me to be very little evidence that that was true. There were no valvular murmurs. She had only a slight systolic murmur at the base of the heart and over the pulmonary area, with very little enlargement of the heart. She was in the hypertensive age period and apparently also at the arteriosclerotic age, but we have no signs of either, and

there was no evidence of lues. The more obscure types of primary cardiac disease do not appear from any evidence that we have. The basal metabolic rates were within limits which would not make one think of thyroid disease. I suppose in a discussion of the case that the question of her low food intake might have been brought up in relation to edema, because her plasma protein was down around the critical level for edema, or because of the present interest in lack of proper vitamin intake, particularly vitamin B. Cardiac disease of unexplained origin is at the moment thought in some cases to be due to this vitamin deficiency.

If we cannot diagnose primary cardiac disease, we are nevertheless confronted with dyspnea, orthopnea, edema and cough to be explained on some basis. There is evidence of secondary cardiac strain with the note that the right side of the heart was somewhat enlarged, that there was a tendency to a right axis deviation by electrocardiogram. There was some enlargement of the pulmonary vessels by x-ray. Electrocardiogram does not help very much as I imagine by the time that it was taken the patient had had some digitalis and that the inversion of the T waves may have been related to that. Therefore, if this is an instance of secondary cardiac effect it seems as if the strain were on the right heart (cor pulmonale) and therefore there was some difficulty in the lesser circulation. That would mean either something in the vascular tree, or in the air containing elements of the lung, or in the mediastinum, to interfere with the functions of these systems which would secondarily produce strain on the right heart.

So far as the vessels in the lungs are concerned one might question the possibility of endarteritis obliterans, so-called Ayerza's syndrome, thought by some to be due to lues, but the fact that cyanosis was not an outstanding feature here would seem to be against that. The Hinton test was negative. There does not seem to be anything described to us in the periphery of the lungs so far as the air containing elements are concerned, such as pulmonary fibrosis or fibroid phthisis, or anything of that sort which would produce strain on the right heart.

We are led to look in the middle of the chest, in the mediastinal region, for whatever pathology is present. There is no clear evidence of any mediastinal tumor and no signs of aneurysm which would interfere with the circulation or with breathing. But it does seem to be rather an obstructive lesion. We have in favor of that the paroxysmal and very prolonged attacks of cough, and the feeling of the patient that the sputum which she raised came from high up in the throat rather than from the lungs. There is evidence of what seems to be a herniation of the lung at the right apex—a



position where true hernia could occur. I have no better explanation for that description of the swelling in the neck. Then there is the sensation of inability to get enough air into the chest and orthopnea out of proportion to the degree of cardiac failure, as indicated by rales at the bases of the lungs, or evidence of fluid in the pleural cavity, as though the orthopnea might possibly be a choice of a position in which obstruction was less distressing. To explain that we have what seem to be most likely, malignancy of the lung, carcinoma of the bronchus, lung abscess or bronchiectasis, with a secondary cardiac effect.

As for malignancy, we cannot bring in the age of the patient as it is unknown. I do not know whether it is for or against malignancy. I do not think the nodes at the angles of the jaw mean very much. There is relative absence certainly of fever and leucocytosis, and a normal sedimentation rate. Against malignancy there is the absence of pain or frank hemoptysis, apparently lack of cachexia, the absence of the wheezy or stridulous type of breathing, and the fact that the patient improved and was able to leave the hospital.

So far as infection is concerned, either lung abscess or bronchiectasis, the story starts with what seems to be a frank infection, with fever, rusty sputum and a story of pneumonia. That may be a red herring across the trail. She apparently got over it and started with some other sort of pulmonary infection, without fever, but all her life she was susceptible to pulmonary infection. There is a large amount of sputum. It is difficult to see where a cupful of sputum could come from at one time, unless we are dealing with some sort of pathology up in this region. If there was a lung abscess there was rupture into a bronchus.

About her final entry in the hospital, this rather sounds as if something had happened in relation to her drinking the water and suggests a rupture of some sort into the mediastinum from the process, whatever it is, involving the pulmonary tree, perhaps this being responsible for her downhill progress. The final event is rather difficult to explain, that is whether it was cardiac asphyxiation or a hemorrhagic type of death. There does not seem to be enough in the cardiac examination to make us think it was cardiac in origin, unless one assumes some unusual thing like rupture into the pericardium or cardiac tamponade. It does not seem like asphyxiation. If something rose and choked her to death she could not get enough air out to cry for help. She died in five minutes. She may have had erosion of some vessel and some hemorrhage into the mediastinum. In summary, I think that the cardiac effects were secondary to pathology of the lung. What was thought to be enlargement of the pulmonary vessels by x ray

might possibly have been mediastinal pathology, and perhaps this process, whether abscess or bronchiectasis, involved more the right and upper part of the midchest.

#### X-RAY INTERPRETATION

DR. GEORGE W. HOLMES. These films show surprisingly little, as stated in the interpretation from the record. The heart shadow is definitely abnormal. It is distinctly enlarged to the right in the auricle. I do not see anything in the lung whatever except this shadow here which I take to be the nipple. We have two oblique films, a right and a left. There is considerable prominence in the region of the left auricle and pulmonary conus, with more or less bulging into the mediastinum. I think both auricles are dilated.

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DR. TRACY B. MALLORY. This is obviously a very difficult case. I wonder if there are any suggestions to be made.

A PHYSICIAN. Was there any examination of the sputum or any statement about its character?

DR. MALLORY. I do not think she brought up any large amount in the hospital.

DR. AUBREY O. HAMPTON. I think that question comes up very often. Patients say they bring up sputum and the chest is negative. I think it should be laughed off more than it is.

DR. MALLORY. I would like to read two consultants' notes, both of them surprisingly correct. Dr. Paul D. White: "There is no doubt about the structural diagnosis of some cardiac enlargement, evidently mainly right ventricular with prominence of the pulmonary artery and its branches, and congestive failure slowly clearing under treatment, but the etiologic diagnosis is obscure. The most likely factor in relation to the history of repeated respiratory infections, the electrocardiogram, and the absence of other evidence of trouble, is the cor pulmonale from pulmonary disease or pulmonary endarteritis obliterans. I can find no definite indication of rheumatic heart disease or congenital heart disease, or of primary left ventricular strain and failure, any one of which might account for right ventricular strain or failure. One must think, however, of the possibility of a previous hypertension which has finally caused strain and failure of the right ventricle with the subsidence of pressure to a low level. There is an aortic systolic murmur which, however, does not seem to be prominent enough to allow a diagnosis of aortic stenosis. In this race lues is always to be thought of also, but there is nothing that confirms such a diagnosis here. I would recommend a pulmonary consultation to see if the pulmonary consultant thinks there may be enough pathology in the



lungs or pulmonary circulation to account for enlargement and failure of the right ventricle. All the trouble has come since her pneumonia of a year and a half ago. She had no symptoms whatsoever before." Dr. Donald S. King: "Cough the presenting symptom, but no purulent sputum. Physical examination shows edema, like congestion, at the left base in back. There is no clubbing of the fingers. X-rays negative so far as lungs are concerned. The only pulmonary process which would explain the picture is bronchiectasis behind the heart, but there is no real evidence of this in oblique films. There is no emphysema. I do not believe a pulmonary process will explain the cardiac changes."

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Coronary heart disease  
Congestive heart failure  
Chronic vascular nephritis

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Cor pulmonale, probably secondary to pathology in the lungs, such as bronchiectasis or lung abscess producing chronic cough

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Pulmonary thrombosis, bilateral, ? primary  
Pulmonary embolus, terminal  
Pulmonary infarct, fresh  
Pulmonary endarteritis?  
Cor pulmonale  
Thrombus of the right auricular appendage  
Leiomyomata uteri  
Endometriosis of the ovaries  
Adenoma of the adrenal cortex

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DR. MALLORY: We found at postmortem a very definite cor pulmonale. The interest in this case lies in its cause. I think we can show you in this colored plate. There lie the lungs with the pulmonary artery opened in situ and you can see that the main pulmonary artery and the chief branches to the right and left lung are almost completely filled with a pinkish gray thrombus. This gray thrombus was quite firmly adherent in gross, and seemed completely organized, but microscopically we found that only the peripheral parts were organized, the central and the superficial parts were not. A pretty careful search throughout the lung failed to show any bronchiectasis or anything from which she could have raised a cupful of sputum. The bronchial tree was entirely negative. Besides the older thrombus in the pulmonary artery we found several partially adherent red and evidently fresh ones in the branches of the upper lobe of the left lung the apex of which showed evidence of early infarction. We found also a thrombus in the right auricle of the heart.

The rest of the autopsy was essentially nega-

tive except for fibroids of the uterus and endometriosis of the ovaries. We made a very careful search of the leg veins and pelvic veins for a possible source of pulmonary emboli without being able to find anything. It at first seemed possible that this thrombus in the right auricle might have been the source of pulmonary emboli but the microscopic examination helps us out to a certain extent by showing that the auricular thrombus is a very fresh and recent one, whereas most of the lesions in the lung are obviously much older. It probably was, however, the source of the fresh emboli and the pulmonary infarct in the upper lobe. As for the primary difficulty, we have to assume either multiple emboli far in the past for which we have no history and no source, or that we are dealing with one of these cases of primary thrombosis of the pulmonary arteries. The minute arteries through both lungs showed marked intimal thickening and evidence of thrombosis and recanalization obviously of many months' duration. Although I think it would be impossible to be sure in this case, primary endarteritis seems a reasonable bet. There is as much evidence for it as there is in most cases in which that diagnosis has been made. It is very similar to a case which Frothingham reported 2 or 3 years ago.

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#### CASE 22472

##### PRESENTATION OF CASE

A 32 year old Italian waiter was admitted complaining of dyspnea.

About 16 months before entry the patient first noted that climbing a hill, which had pre-

position where true hernia could occur. I have no better explanation for that description of the swelling in the neck. Then there is the sensation of inability to get enough air into the chest and orthopnea out of proportion to the degree of cardiac failure, as indicated by rales at the bases of the lungs, or evidence of fluid in the pleural cavity, as though the orthopnea might possibly be a choice of a position in which obstruction was less distressing. To explain that we have what seem to be most likely, malignancy of the lung, carcinoma of the bronchus, lung abscess or bronchiectasis, with a secondary cardiac effect.

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##### PRESENTATION OF CASE

A 32 year old Italian waiter was admitted complaining of dyspnea.

About 16 months before entry the patient first noted that climbing a hill, which had pre-

viously afforded him no discomfort, now caused considerable dyspnea. He visited a physician who told him that he had a "leaking valve" and treated him with what was presumed to be digitals. After 2 weeks of this treatment the patient felt better and returned to his work. Six weeks before coming to the hospital he developed a severe cough and was told by a physician that he had bronchiectasis. Shortness of breath now recurred and he was compelled to get out of bed at night and go to an open window for relief. He became unable to sleep unless he was propped up with several pillows. Occasionally his breathing was wheezing in character and his activity was markedly curtailed. About 5 weeks prior to admission he had a vomiting spell which was so severe that he could not catch his breath. At the same time he noted some cyanosis of his lips and face. There was frequent palpitation after any exertion and occasionally his heart seemed "to stop and twist about in his chest." Two weeks ago he first noted edema of the ankles which persisted and he was compelled to discontinue work. He began to have a constant pressing pain in the right upper quadrant. At no time was he confined to bed. Shortly before coming to the hospital he again began to vomit.

Ten years before entry he had chilly sensations and fever for some time. Shortly afterward he was treated for a septic hand and blood poisoning. Five years ago for a short time he had frequent shooting pains in the chest and an examination at that time showed a normal heart.

Physical examination showed a well-developed and nourished man with flushed facies, sweating profusely. He was markedly cyanotic, orthopneic, and the right neck veins were engorged. The pupils were dilated but reacted to light. The apex impulse was felt in the fifth interspace 12 centimeters from the midsternal line. It was pounding in character and imparted a systolic thrill. Coarse systolic and late diastolic rumbling murmurs were audible at the apex and loud rumbling systolic and early diastolic murmurs were heard at the aortic area. The blood pressure was 160/80 and a Corrigan pulse was observed. The right chest was dull below the level of the fourth rib and flat beneath the angle of the scapula. Rales were heard at the lower half of the left chest. The liver extended 4 to 5 fingerbreadths beneath the costal margin. The abdomen was distended and some dullness was elicited in the flanks. Both legs were definitely edematous.

The temperature was 99.5°, the pulse 90. The respirations were 30.

Examinations of the urine showed a specific gravity from 1.008 to 1.034. Large traces of albumin were consistently present and the sediments showed occasional white blood cells and

0 to 15 red blood cells with occasional hyaline and granular casts. The blood showed a red cell count of 5,780,000, with a hemoglobin of 75 per cent. The white cell count was 11,400, 78 per cent polymorphonuclears. A stool examination was negative. A Hinton test was negative. A blood culture showed no growth. The sedimentation rate was 121 millimeters per minute. An electrocardiogram showed partial A-V block with a P-R interval of 0.25 seconds. P<sub>1</sub> and P<sub>2</sub> were prominent and notched and there was moderate right axis deviation.

X-ray examination showed dullness obliterating the lower half of the left lung field, obscuring the diaphragm and left border of the heart. The dullness had a curved upper border. The lower half of the right lung field was mottled and the diaphragm obscured. The heart was shifted to the right.

The patient's temperature fluctuated irregularly between 98° and 102°. A tap of the right chest on the day of entry yielded 1,000 cubic centimeters of amber-colored fluid with a specific gravity of 1.008. A cell count showed 850 red blood cells, 52 lymphocytes, and 1 monocyte. The protein content was 1 per cent. Culture showed no growth. The nonprotein nitrogen of the blood was 28 milligrams. His white blood cell count gradually rose to 26,000. He became nauseated and vomited several times. Digitalis was discontinued and on the sixth day a left chest tap yielded 445 cubic centimeters of slightly blood tinged fluid with 19,150 red blood cells, 1,900 polymorphonuclears, 980 lymphocytes, and 10 monocytes. The specific gravity was 1.010 and the protein content 3.2 milligrams per cent. Cultures were negative. His condition became precarious and he suffered hemoptysis on several occasions. At the end of the third week an electrocardiogram showed auricular fibrillation with a ventricular rate of 50. T<sub>1</sub> was low and T<sub>2</sub> and T<sub>3</sub> inverted. On the twenty-fifth day he suddenly developed marked dyspnea which was partially relieved by an oxygen tent. Four days later a pleuro-pericardial friction rub became audible. No details relative to it were noted. He rapidly developed anasarca, became psychotic, and died suddenly on the thirty-fifth hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR WILLIAM PAUL THOMPSON. From the description of the examination of the heart it seems evident that this patient was suffering from valvular disease, and that mitral stenosis and mitral and aortic regurgitation were present. Aortic stenosis to some degree is also probable because of the loud aortic systolic murmur, even though the confirmatory aortic systolic thrill is not described. If mitral stenosis was present, there is but one etiologic factor to be considered, and that is rheumatic fever. While

there is no definite history of past rheumatic infection, the "chilly sensations and fever for some time" ten years before entry may well represent active rheumatic infection.

The history during the sixteen months preceding death is one of increasing failure of the left ventricle, as evidenced by the dyspnea and due to the aortic valve disease, or one of increasing pulmonary congestion due to the obstruction to outflow of blood from the lungs occasioned by the mitral stenosis. The severe cough which was present during the six weeks preceding entry is further evidence favoring either one of these factors in an equal manner, but the occurrence of protracted nocturnal dyspnea with wheezing (cardiac asthma) favors left ventricular failure due to the aortic valve disease as the more important factor. The edema and the pain in the right upper quadrant, the latter doubtless due to hepatic congestion, together with the engorgement of the neck veins noted on admission, are findings establishing the diagnosis of failure of the right ventricle, either secondary to failure of the left ventricle or to the strain imposed upon the right ventricle by the mitral stenosis of high degree.

The slight elevation of body temperature, the slight leukocytosis, and the prolonged P-R interval in the electrocardiogram on admission are factors pointing toward active rheumatic infection. The fever and leukocytosis, however, may both be due to the congestive failure and it is not stated whether the digitalis, which had been prescribed at the beginning of symptoms sixteen months ago, and which might be the cause of the partial block, had been continued up to the time of admission. We cannot be certain, then, whether rheumatic infection was present, but I am inclined to believe it was, chiefly because if digitalis had been given in a quantity sufficient to produce P-R interval of this length, congestive heart failure of this severity would be unlikely. In favor of digitalis as the cause of this delay in auriculoventricular conduction is the history of vomiting shortly before the patient entered the hospital, which however, may well be a part of the engorgement of the liver.

The occurrence of hemoptysis on several occasions, the increasing white blood cell count, the development of the friction rub, and the progressive downhill course all favor pulmonary infarction, due most likely to emboli but possibly the result of multiple thrombi as we have seen recently in a number of cases. The source of emboli is problematic. Of the two possible sources, the right side of the heart and the peripheral veins, I favor the latter as a more common seat of thrombi in congestive heart failure. The presence of auricular fibrillation which began sometime while the patient was

in the hospital, suggests the right auricle as the seat of a mural thrombus. The sudden development of marked dyspnea ten days before death points also toward pulmonary embolism. The sudden death likewise points toward a large embolus obstructing the pulmonary artery at its bifurcation.

The electrocardiograms are of interest in that the prominence and notching of the P waves in leads I and II, together with the right axis deviation, make mitral stenosis almost certain. The low T wave in lead I and the inverted T waves in leads II and III described in the second electrocardiogram are almost certainly due to digitalis.

The case is somewhat unusual in that death in rheumatic heart disease followed the first failure, from which we may ordinarily expect a fair return of function in a young individual. We have learned, however, that active rheumatic infection and pulmonary infarction in the presence of failure are two things which make the prognosis exceedingly grave.

#### CLINICAL DIAGNOSES

Rheumatic heart disease  
Mitral and aortic stenosis and regurgitation  
Active rheumatic fever  
Congestive failure

#### DR. WILLIAM PAUL THOMPSON'S DIAGNOSES

Rheumatic heart disease, probably active  
Mitral stenosis and regurgitation  
Aortic regurgitation  
Probably aortic stenosis  
Partial A-V block followed by auricular fibrillation  
Congestive heart failure of the right and left ventricles  
Pulmonary infarction, multiple  
Terminal massive pulmonary embolism  
Mural thrombus in the right auricle?  
Thrombosis of peripheral veins, most likely in the pelvis or legs?

#### ANATOMIC DIAGNOSES

Rheumatic heart disease  
Endocarditis, chronic rheumatic, aortic, with stenosis, mitral and tricuspid  
Mural thrombus, right auricle  
Pericarditis, acute fibrinous  
Chronic passive congestion, liver, lung, spleen and kidneys  
Pleuritis, acute fibrinous, bilateral, left marked  
Pulmonary infarct, right middle lobe  
Hydrothorax, bilateral, right, marked  
Pulmonary atelectasis, bilateral  
Pleuritis, chronic fibrous, bilateral  
Petechnal hemorrhages, visceral pericardium and peritoneum

Ascites, slight  
Renal infarcts, multiple, left, healed  
Edema, generalized  
Osteo-arthropathy of fingers

#### PATHOLOGIC DISCUSSION

DR TRACY B MALLORY Cardiologists are rivaled only by the genitourinary surgeons in the accuracy of their antemortem diagnoses. Consequently we expect and generally learn that the important findings of the autopsy have been accurately predicted and the pathologist can hope to catch them only on the details and upon the complicating factors. This patient did have rheumatic heart disease with both aortic and mitral involvement. From the anatomic findings both stenosis and regurgitation must have been present at each valve ring though in each case the stenosis was by far the less important factor. We found in addition a definite tricuspid involvement. Evidence of acute rheu-

matism was lacking on the valves and in the myocardium, but was present in the form of an acute pericarditis and was probably also indicated by the presence of multiple petechial hemorrhages over the serous surfaces of the pericardium and the peritoneum. The heart was markedly and generally hypertrophied with dilatation of all the cavities. A thrombus was present in the right auricle and one pulmonary infarct was found to substantiate Dr Thompson's prediction. Numerous infarcts were also found in the left kidney. Since the valvular lesions were apparently inactive, I think one must assume that there had also been at one time a thrombus in the left auricle. Large amounts of fluid had reaccumulated in the right chest, and the right lung was almost completely atelectatic. The liver, as might be expected in a case with tricuspid involvement, showed an unusually severe grade of passive congestion with considerable necrosis of cells in the centers of the lobules.

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## THE NOBEL PRIZE IN MEDICINE 1936

In conferring the Nobel Prize in Medicine upon Henry Hallett Dale and Otto Loewi the Stockholm Committee has for the first time recognized pure pharmacology in its awards\*, and by its action it has also given prominence to one of the newest and most highly significant fields of medical and biologic research, "the neuro-humoral transmitters". In 1914 Dale after pointing out that acetyl-choline mimicked the actions of the cranio-sacral division of the autonomic system, much as adrenalin mimicked sympathetic innervation, wrote the following prescient sentence "The possibility may, indeed, be admitted, of acetyl-choline, or some similarly active and unstable ester, arising in the body and being so rapidly hydrolysed by the tissues that its detection is impossible by the known methods. Such a suggestion," he added, "would acquire interest if methods for its experimental verification could be devised".

The previous awards in Medicine and Physiology are listed on page 99\* with biographical notices of Professors Dale and Loewi

Shortly before Dale's paper was published war had been declared, and, as Cannon points out,<sup>2</sup> men's thoughts were transferred to more urgent matters

It remained for Otto Loewi, the well-known professor of pharmacology at Graz in Austria to devise the means of verifying Dale's brilliant surmise. The story of how Loewi happened to perform the classical experiments that proved that acetyl-choline is liberated at the vagus nerve endings deserves to be recorded in detail. "One night, having fallen asleep while reading a light novel, he awoke suddenly and completely, with the idea fully formed that if the vagus nerves inhibit the heart by liberating a muscarin-like substance, the substance might diffuse out into a salt solution left in contact with a heart while it was subjected to vagal inhibition, and that then the presence of this substance might be demonstrated by inhibiting another heart through the influence of the altered solution. He scribbled the plan of the experiment on a scrap of paper and went to sleep again. Next morning, however, he could not decipher what he had written! Yet he felt that it was important. All day he went about in a distracted manner, looking occasionally at the paper, but wholly mystified as to its meaning. That night he again awoke, with vivid revival of the incidents of the previous illumination, and after this experience he remembered in his waking state both occasions. He set up a frog heart filled with Ringer's fluid, and after inhibiting the heart by stimulating the vagus nerve, found that the fluid had acquired a new property, that of being able to induce in another frog heart typical inhibitory vagal effects."<sup>2</sup>

Loewi's brief four page announcement<sup>3</sup> was greeted with considerable skepticism, a controversy followed, but in the end he was entirely vindicated and it is now believed that a substance akin to acetylcholine is liberated wherever parasympathetic nerves end.<sup>4, 5</sup> The generalization, indeed, thanks to the work of Dale and his pupils, has been carried much farther. Only two years ago it was announced that acetyl-choline stimulated sympathetic ganglia,<sup>6</sup> and it was inferred that wherever preganglionic fibers of the autonomic system end, whether in Remak's ganglion of the heart or in the stellate ganglion of the thoracic sympathetic there acetylcholine is liberated when the preganglionic fibres are activated. Within the last year Dale and his pupils have caused us further to extend our ideas of the activities of acetylcholine in the bodily economy, for the somatic motor nerves to skeletal muscles appear also to have their impulses transmitted to the contractile elements of the fibres through the agency of acetylcholine.<sup>7</sup> If this is true, every motor fiber emerging from the central nervous

system, such as the sympathetic preganglionic fibers, the parasympathetic fibers and the somatic motor fibers, transfers its influence by means of acetyl-choline. If these generalizations are vindicated by future work, and it seems entirely probable that they will be, we can warmly congratulate the Stockholm Committee upon their courage in recognizing, while it is still in the process of being formulated, one of the greatest generalizations in the history of medical thought.

Those in this country who have played so conspicuous a part in unraveling the complementary story of neuro-humoral transmission of the peripheral sympathetic (as opposed to parasympathetic) impulses will undoubtedly rejoice to see the doctrines that they have helped to develop so fittingly recognized, and for their share they are deserving of equal praise.

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### THE HOUSING PROBLEM

It is generally taken for granted that the standard of living in these United States is on at least as high a plane as any other country in the world. Consequently, the statement regarding housing conditions of low income families in this country, made by Dr. C-E A Winslow of the Yale University School of Medicine before the American Public Health Association at their recent meeting in New Orleans, comes as a distinct surprise to many of us. He said that the homes of the poor in the United States both in the tenement districts of the cities and in the impoverished rural communities, are much more unhygienic than those of similar groups in any of the leading countries of Western Europe.

It is well known that poor housing and high mortality rates go hand-in-hand. According to Dr. Winslow, however, public health authorities should not be content with merely lowering death rates. "Neither physical nor mental health nor fullness of living is possible when a whole family is crowded into a single room of

a city tenement or struggling for survival in an unsanitary shack on an Appalachian mountain side." Not only must such homes be destroyed, but healthful ones must be provided at a cost to the dwellers that is consistent with their low incomes.

Dr. Winslow believes that this problem is one of the most urgent that faces health officials at the present time and that the need for proper housing facilities is so widespread that it can be properly handled only by "a permanent federal agency for housing and by a unified national policy, such as is proposed in the Housing Bill introduced by Senator Wagner at the last session of the Congress."

### THE PRESENT CONFUSED SITUATION

SEVERAL months ago the American Foundation issued a letter to prominent and experienced physicians of the United States asking for opinions as to whether any essential changes are needed in the present organization of medical service. The recipients of these letters were requested to specify the direction of the opinions submitted, applicable to the following questions:

"Any form of insurance, voluntary or compulsory? The greater participation by the state in the provision of medical service to the people? Government subsidies without government administration? The extension of the public health services—and which of them—federal, state, local or all of these? Extension of community hospitalization, group clinics, public health nursing? More direct relation between medical science as represented by the leading physicians of the country and public health administration? Is it desirable or imperative that the medical profession through the medical societies should control standards, public health appointments, etc., how do you think that this end could best be achieved?"

The Foundation explained that it had nothing to advocate, had no preconceived objective, but proposed to summarize and present "the views of experienced men in the medical profession because they are the persons whose judgment should control."

The "member in charge" has stated that a considerable number of the most distinguished physicians in New England, particularly in Boston and New Haven, have already answered the inquiry. Several state medical journals have endorsed this movement and reports have been received to the effect that the chairman of the Bureau of Medical Economics of the American Medical Association has spoken favorably of the work of the Foundation.

The names of those associated with the American Foundation are as follows: Curtis Bok,



Esther Everett Lape, Karl T Compton, Hugh L Cooper, Thomas W Lamont, Robert A Millikan, James D Mooney, Roscoe Pound, Mrs Ogden Reid, Elihu Root, William Scarlett, Truman G Schnabel, M D, Mrs F A Vanderlip, John G Winant, and Elizabeth F Read These persons are of wide experience and recognized as public-spirited citizens

This movement by the Foundation seems to indicate that the medical profession and coordinate organizations have not found a satisfactory solution of questions of common interest relating to medical service and is a confirmation of the prediction that the public will in time turn its attention to this essential contribution to human welfare

Although organized medicine has adopted principles designed to govern its application to the ills of mankind and many experiments are underway, there is confusion in the minds of many as to details of procedure, so that a movement of this character warrants endorsement by all parties in interest The purpose shown by this group is most encouraging The result of this study is anticipated with the expectation that constructive conclusions will be forthcoming

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

LYON, JAMES A M D Maryland Medical College 1906 F A C P Cardiologist, Emergency Hospital and Central Dispensary, Columbia Hospital for Women, and The Children's Hospital, Washington, D C Professor of Clinical Cardiology, Georgetown University School of Medicine, Washington, D C His subject is "Cardiac Pain and Its Significance" Page 953 Address Washington Medical Building, 1801 Eye Street, Northwest, Washington, D C

FLYNN, JOHN M M D Harvard University Medical School 1927 Junior Associate in Medicine, Peter Bent Brigham Hospital His subject is "A Scheme for the Treatment of Diabetes Mellitus with High Carbohydrate Low Fat Diets" Page 955 Address 520 Commonwealth Avenue, Boston, Mass

LITTLE, RUFUS R A B, M D University of Pennsylvania School of Medicine 1932 Assistant Physician, North Reading State Sanatorium His subject is "Artificial Pneumothorax in Adolescents" Page 960 Address North Reading State Sanatorium, North Wilmington, Mass

DAMESHEK, WILLIAM M D Harvard University Medical School 1923 Associate Physi-

cian, Beth Israel Hospital Physician, Boston Dispensary Assistant Professor in Medicine, Tufts College Medical School Instructor in Medicine, Harvard University Medical School, Courses for Graduates His subject is "Progress in Hematology Late 1934 and 1935" Page 962 Address 371 Commonwealth Avenue, Boston, Mass

## The Massachusetts Medical Society

### PROPOSALS FOR LEGISLATION

*To the Fellows of the Massachusetts Medical Society*

With the knowledge that the opening of the General Court is but a few weeks away, undoubtedly many individuals have in mind legislation designed to correct injustices or to promote the interests of the medical profession

Undoubtedly, as in the past, some such legislation will be proposed in good faith and with the best intentions but without thorough study and consideration by the proper committees of the Society

It is therefore requested that, if the support and backing of the Society are desired by proponents of medical legislation, either individual Fellows, committees or even state departments that such proposals should be submitted to the Secretary for presentation to the Committee on State and National Legislation for study and report

CHARLES E MONGAN, *President,*  
Massachusetts Medical Society

### FOURTH ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning November 23

#### Bristol North

(Course omitted this week on account of Thanksgiving)

#### Bristol South (Fall River Section)

Monday November 23 at 4 00 p m at the Stevens Clinic of the Union Hospital Fall River Subject Psychiatry (a) Psychobiology in General Medicine (b) The Common Neuroses Instructor K J Tillotson Howard P Sawyer Co-Chairman

#### Bristol South (New Bedford Section)

Friday November 27 at 4 00 p m at St Luke's Hospital New Bedford Subject Diabetes General Plan for Treatment in Uncomplicated Cases Diet Insulin (Regular and Protamine) Exercise Instructor H F Root Robert H Goodwin Co-Chairman

## Franklin

Wednesday November 25 at 8 00 p m, at the Franklin County Public Hospital, Greenfield  
Subject *Complications of Diabetes and Their Treatment Coma, Insulin Reactions, Surgery (Gangrene, Carbuncle, Etc), Marriage and Pregnancy, Tuberculosis and Heart Disease* Instructor Priscilla White Halbert G Stetson, Chairman

## Middlesex North

Friday, November 27 at 7 00 p m, at St Joseph's Hospital, Merrimack Street, Lowell  
Subject *Stomach and Duodenal Ulcer Diagnosis and Treatment* Instructor E S Emery Jr Samuel A Dibbins, Chairman

## Middlesex South

Tuesday, November 24, at 4 00 p m, at the Cambridge Municipal Hospital, Cambridge  
Subject *Anesthesia (a) Drugs in Anesthesia (b) General Care of Patient in Anesthesia* Instructor Joseph Tartakoff Edmund H. Robbins, Chairman

## Norfolk South

Monday, November 23, at 8 30 p m, at the Quincy City Hospital, Quincy  
Subject *Complications of Diabetes and Their Treatment Coma Insulin Reactions, Surgery (Gangrene Carbuncle, Etc), Marriage and Pregnancy Tuberculosis and Heart Disease* Instructor Priscilla White David L Belding, Chairman

## Plymouth

Tuesday November 24, at 4 00 p m at the Brockton Hospital, Brockton  
Subject *The Physical Examination Its Scientific Clinical and Economic Implications* Instructor L E Parkins W H Pulsifer, Chairman

## Worcester North

Friday, November 27 at 4 30 p m at the Burbank Hospital, Fitchburg  
Subject *Blood Diseases Diseases Affecting the White Blood Cells Leukemias Agranulocytosis, Mononucleosis* Instructor W B Castle Edward A. Adams Chairman

## MISCELLANY

### DALE AND LOEWI AND THE PREVIOUS NOBEL PRIZE MEN IN PHYSIOLOGY AND MEDICINE

On another page we have commented upon the significance of the Nobel award in Medicine for 1936. It will perhaps interest our readers however, to have a few further details concerning Professors Dale and Loewi the latest recipients of the Prize and a list of the previous awards in the field of physiology and medicine, arranged according to countries.

Henry Hallett Dale, the son of P J Dale was born at London in 1875, and received his primary ed-

ucation at Tollington College, and Leys School (Cambridge) he later attended Trinity College, Cambridge, being as an undergraduate a Coutts-Trotter student, and was later appointed to the George Henry Lewes studentship, at University College London, he held the Sharpey Scholarship. Dale's clinical training was received at St Bartholomew's Hospital, but he did not take his degree M D till 1909. In 1906 he received the appointment of Director to the Wellcome Physiological Research Laboratories, a post that he continued to hold until 1914. It was during this period that Dale turned his attention to pharmacology and became first interested in the actions of acetylcholine. He was elected a Fellow of the Royal Society in 1914. During the Great War he was made the head of the department of biochemistry and pharmacology under the Medical Research Council, and he continues to hold this post as Director of the National Institute for Medical Research at Hampstead. Dale was knighted in 1932.

Despite the heavy responsibilities of his secretaryship to the Royal Society, which he has held since 1925 and his membership on the General Medical Council, which he has served since 1927, Professor Dale has continued in active pharmacological investigation and has attracted an increasing body of students. Indeed his laboratory, during the past ten years, has become one of the principal training grounds for European, as well as American, pharmacologists. Dale himself, a Quaker, has an unusual gift of lucid expression, both spoken and verbal. Many in Boston will recall with pleasure his visit at the time of the Physiological Congress in 1929.

Otto Loewi, born June 3 1873 at Frankfurt am Main received his preliminary education at Strasbourg and Munich, returning in 1896 to Strasbourg to complete his medical studies. He then worked for a year under Carl von Noorden at the Städtisches Krankenhaus at Frankfurt am Main. His training as a pharmacologist was received principally from Hans H. Meyer whose Institute in Marburg he entered in 1898 and whom he accompanied to Vienna when Meyer accepted his call in 1905. Loewi was appointed Lecturer at Marburg in 1900 and Professor in 1904. He received a professorship in Vienna in 1906 and in 1909 was called to the Chair of Pharmacology at Graz in southern Austria which post he has retained until the present time. Loewi, in the course of his active career in experimental pharmacology has touched nearly all phases in physiology and experimental medicine. In 1908 he published his account of adrenalin mydriasis which is still known as 'Loewi's symptom' (*Arch f exper Path, u Pharmacol* 150 83, 1908). His other investigations have related to nucleic metabolism, diabetes, renal function, digitalis and the autonomic nervous system. His first paper on humoral transmission, as indicated on another page, was published in 1921. Since that time he has devoted his energies largely to the further analysis of neuro-humoral mechanisms. Many will remember Professor Loewi's Edward K.

Dunham Lectures, given at the Harvard Medical School in May, 1933, in which a full account was given of his investigations in this field.

The Nobel Prize men in Physiology and Medicine are listed below according to countries. It will be seen that Germany still heads the list from the point of view of numbers.

#### THE NOBEL PRIZE IN PHYSIOLOGY AND MEDICINE

##### *Austria*

- 1914 Robert Barany (Vienna), for his work on the physiology and pathology of the vestibular system. The prize was awarded in 1915
- 1927 Professor Julius Wagner Jauregg (Vienna), for his discovery of the therapeutic value of malaria inoculation in the treatment of dementia paralytica.
- 1936 Professor Otto Loewi (Graz) for studies on neuro-humoral transmission. The prize was shared with Professor H. H. Dale (Great Britain)

##### *Belgium*

- 1919 Professor Jules Bordet (Brussels) for his discoveries in connection with immunity. Awarded in 1920

##### *Canada*

- 1923 Professor Frederick Grant Banting (Toronto) and Professor John James Richard MacLeod (Toronto), jointly, for the discovery of insulin.

##### *Denmark*

- 1903 Professor Niels Ryberg Finsen (Copenhagen), in recognition of his treatment of diseases especially *lupus vulgaris* with concentrated light rays
- 1920 Professor August Krogh (Copenhagen) for his discovery of the regulation of the motor mechanism of the capillaries
- 1926 Professor Johannes Fibiger (Copenhagen) for his discovery of the Spiroptera carcinoma. Awarded in 1927

##### *France*

- 1907 Charles Louis Alphonse Laveran (Paris) for his work on the part played by protozoa in the generation of disease
- 1908 Professor Elie Metchnikoff (Paris) for work (with Professor Ehrlich) on immunity. The prize was divided equally with Professor Paul Ehrlich (Frankfurt am Main)

##### *Germany*

- 1901 Professor Emil Adolf von Behring (Marburg) for his work on serum therapy against diphtheria
- 1905 Professor Robert Koch (Berlin) for his work on tuberculosis
- 1908 Professor Ehrlich (Frankfurt am Main) for work (with Professor Metchnikoff) on immunity. The prize was divided equally with Professor Metchnikoff (Paris)

- 1910 Professor Kossel (Heidelberg), for his achievements in the chemistry of the cell by his works on proteins, the nucleic substances included

- 1922 Professor Otto Meyerhoff (Kiel) for his discovery of the correlation between the consumption of oxygen and the production of lactic acid in the muscles. The prize for the year was divided equally in 1923 with Professor A. V. Hill (Great Britain)

- 1931 Professor Otto Warburg (Berlin), for his study of the oxidation-reduction system of living cells

- 1935 Professor Hans Speman, for studies on experimental embryology

##### *Great Britain*

- 1902 Sir Ronald Ross, for his work on malaria
- 1922 Professor Archibald Vivian Hill for his discovery relating to the heat production of muscles. The prize for the year was divided equally in 1923 with Professor O. Meyerhoff (Kiel)

- 1929 Sir Frederick Gowland Hopkins for the discovery of growth-promoting vitamins. The prize was divided equally with Dr C. Eijkman (Utrecht)

- 1932 Sir Charles Scott Sherrington and Professor Edgar Douglas Adrian, for elucidation of the functions of the single motor unit in the central nervous system.

- 1936 Professor Henry Hallett Dale, for studies on neuro-humoral transmission. The prize was divided equally with Dr Otto Loewi (Graz)

##### *Italy*

- 1906 Professor Camillo Golgi (Pavia) for work (with Professor Ramon y Cajal) on the structure of the nervous system. The prize was divided equally with Professor Ramon y Cajal

##### *Netherlands*

- 1924 Professor Willem Einthoven (Leyden), for his discovery of the mechanism of the electrocardiogram.

- 1929 Dr C. Eijkman (Utrecht) for the discovery of the antineuritic vitamin. The prize was divided equally with Sir Frederick Gowland Hopkins (Great Britain)

##### *Russia*

- 1904 Professor Ivan Petrovitch Pavlov (St Petersburg), in recognition of his work on the physiology of digestion

##### *Spain*

- 1906 Professor Santiago Ramon y Cajal (Madrid) for work (with Professor Golgi) on the structure of the nervous system. The prize was divided equally with Professor Camillo Golgi (Pavia)

##### *Sweden*

- 1911 Professor Allvar Gullstrand (Uppsala), for his work on the dioptrics of the eye

*Switzerland*

- 1909 Professor Theodor Kocher (Berne), for his work on the physiology pathology, and surgery of the thyroid gland

*Tunisia*

- 1928 Dr Charles Nicolle (Tunis) for his work on typhus exanthematicus

*United States*

- 1912 Dr Alexis Carrel (New York), for his work on vascular ligature and on the grafting of blood vessels and organs
- 1930 Dr Karl Landsteiner (New York) for his work on blood groups
- 1933 Dr Thomas Hunt Morgan (Pasadena), for his investigations concerning the functions of chromosomes
- 1934 Professor George Hoyt Whipple (Rochester, N Y), Dr George Richards Minot (Boston), and Dr William Paily Murphy (Boston), for their discovery of the value of liver in pernicious anemia

J F F

## CONNECTICUT NEWS

## TUBERCULOSIS IN HARTFORD

*The Hartford Courant* of October 24, 1936, in an editorial entitled 'Too Much Tuberculosis' advises its readers that seventy nine persons died of tuberculosis in Hartford during 1935 a figure much too high. The Board of Health has voted to put forth new efforts to reduce this mortality. Dr Horning City Health Commissioner has appointed a committee consisting of Dr William M Stockwell Superintendent of Cedarcrest Sanitarium, Dr James F Murphy president of the Hartford Tuberculosis and Public Health Society and Dr Philip F Parshley, physician in charge of a special tuberculosis project in one of the public schools. The committee has already declared the present program inadequate and believes it necessary to develop a clinic around a hospital where x-ray and fluoroscopic facilities and consultation services are available. A fulltime physician will be required to oversee this program but, at present funds for such a position are available only until July 1, 1937. At present the per capita assessment in Hartford for tuberculosis control is two and one-half cents. In the opinion of Dr Horning it should be doubled in order to execute an adequate program. Dr Maxwell O Phelps will resign the position as part time director of the tuberculosis bureau of the Board of Health when a fulltime director is appointed.

## WHOOING COUGH OUTBREAK

During October Hartford and New Britain were the centers of an outbreak of whooping cough fifty five new cases being reported in the state in one week almost two thirds of which occurred in these two cities.

## LOBAR PNEUMONIA INCREASING

During the present year, with the season of great est incidence to come lobar pneumonia is on the increase in Connecticut. For the three weeks ending October 24 there were sixty four cases reported as compared with thirty cases for the corresponding three weeks in 1935.

## HARTFORD RETREAT TO BUILD ADDITION

The Neuro Psychiatric Institute and Hospital of the Hartford Retreat has filed an application for permission to erect a new building at a cost of \$16,000. This building will provide for a boiler plant a barber shop and a print shop.

## NEWINGTON HOME FOR CRIPPLED CHILDREN

A new building housing a department for the care of infants and children under two years of age and an isolation department and adequate facilities for the reception of new children were cited as the outstanding needs at the Newington Home for Crippled Children by its superintendent in her annual report before the board of directors recently.

Dr Ralph E Kendall pathologist, was appointed by the Medical and Surgical Staff to fill the vacancy caused by the resignation of Dr Wilmar M Allen. Dr E Myles Standish, dermatologist, was appointed to succeed the late Dr Dwight W Tracy.

The hospital has increased its service during the past year more than ever before in its history. A total of 74,045 days' care was given to children from 120 communities. Four hundred and fifty patients were cared for free of charge at the triweekly clinics. The physical therapy department gave 15,894 treatments during the year. 1811 of these to out patients. These free treatments entailed a heavy financial burden because of steadily rising costs in equipment and salaries.

DR. WILMAR M ALLEN recently appointed Director of the Hartford Hospital, was tendered a dinner on November 5, 1936 by friends on the hospital staff. Dr Claude W Munger of Grasslands Hospital New York president of the American Hospital Association was the guest speaker. Colonel Louis R. Cheney president of the board of directors of the hospital made some fitting remarks. More than one hundred and thirty physicians attended.

DR. VALERIAN S MICHALOWSKI, of New Britain a captain in the Medical Corps Reserve, has accepted six months active duty as camp surgeon with the Civilian Conservation Corps and has been detailed to Fort Williams Maine.

DR. THOMAS G SLOAN, aged 61 years who had practiced medicine in Manchester for almost thirty three years died suddenly of heart disease at his home on October 30, 1936. Dr Sloan began his practice in Manchester in 1903 when he succeeded to the practice of Dr Mark S Bradley. Dr Sloan was a native of New Haven studied medicine at Yale and

then at the College of Physicians and Surgeons of Columbia University New York He received his medical degree in 1899 and served for one year as intern at the New Haven Hospital Practicing for a year and a half in New Haven he then moved to Manchester Dr Sloan is survived by his widow and daughter in Manchester, and a sister in New Haven.

DR. A. ELIZABETH INGRAHAM Director of the Bureau of Child Hygiene of the State Department of Health since 1923 has resigned effective January 1 1937 Dr Ingraham will retire from active public health work. From a small beginning the well child conferences of which Dr Ingraham has charge have grown until there are more than eighty now held regularly in various parts of the state Dr Ingraham joined the State Department of Health after several years in private practice two years of which she served the Serbian government in medical work immediately after the World War She also held the position of resident physician for a short period at the State Farm for Women In Serbia, Dr Ingraham founded a hospital for the government and organized a training school

#### TUFTS COLLEGE MEDICAL SCHOOL

The following promotions have been made on the Faculty of Tufts College Medical School

- Dr James J Hepburn Professor of Surgery to succeed Dr Horace Binney now Professor Emeritus of Surgery  
Dr Benjamin Sachs Professor of Ophthalmology to succeed Dr Edward K Ellis now Professor Emeritus of Ophthalmology  
Dr James M Baty Assistant Professor of Pediatrics  
Dr Francis C McDonald Assistant Professor of Pediatrics  
Dr Arthur Berk Assistant Professor of Psychiatry  
Dr Otto J Hermann Clinical Professor of Surgery  
Dr Harry H Powers Assistant Professor of Biochemistry  
Dr Frederick W Stetson Professor Emeritus of Medicine  
Dr Louis A O Goddu Clinical Professor of Orthopedics  
Dr Armin Klein Clinical Professor of Orthopedics  
Dr John D Adams Assistant Professor of Orthopedics

New appointments to the Faculty of Tufts College Medical School are as follows

- Dr John L Jacobs Associate Professor of Bacteriology  
Dr William E Browne Clinical Professor of Surgery  
Dr Archibald McK Fraser Clinical Professor of Surgery  
Dr Andrew R. MacAusland Clinical Professor of Orthopedics  
Dr W Russell MacAusland Clinical Professor of Orthopedics

Four Charlton Fund Fellowships have been awarded this year for the second time at the Tufts College Medical School The stipend of these Fellowships varies from \$1200 to \$1500 for one year, and the recipients devote their time to teaching and research It is expected that these Fellowships will be granted every year in the future

Dr A. Warren Stearns Dean of Tufts College Medical School has been appointed a member of the Staff of *The New England Journal of Medicine*

The William Harvey Society of Tufts College Medical School again offers a varied program The lectures are open to all who are interested in the medical profession Programs of the meetings will appear in this *Journal*

Pathfinders in American Medicine the sixth in a series of annual pageants depicting medical history was presented by Tufts College Medical School in Jordan Hall, Boston on November 13, 1936 This year's pageant presented characters from the time of Drs John Morgan and Benjamin Rush to that of Drs Reed and Gorgas and included a portrayal of Marie Zakrzewska, founder of the New England Hospital for Women and Children The various parts are written and played by students Past presentations have been published in book form under the title *One Hour of Medical History*

*The Tufts College Medical School Journal* is opening an exchange system all medical schools are invited to participate

Extensive building improvements have been made at Tufts College Medical School the amphitheater has been converted into additional laboratories for research and demonstration for the Department of Bacteriology

The number of students in the entering class at Tufts College Medical School has been reduced this year from 125 to approximately 100

Dr James Joseph Hepburn has been appointed Professor and head of the Department of Surgery at Tufts College Medical School He graduated from Harvard College in 1906 and from Harvard Medical School in 1909 He then served a surgical internship at the Boston City Hospital and began teaching at Tufts College Medical School in the Department of Medicine in 1912 For a number of years he was connected with the Department of Anatomy and in 1916 he became an instructor in the Department of Surgery In 1924 he was made an assistant professor and in 1922 was appointed a clinical professor Dr Hepburn has been a Fellow of the American College of Surgeons since 1920

#### HONORS CONFERRED ON LORD TWEEDSMUIR AND DR HENRY A CHRISTIAN

At the convocation of the Royal College of Physicians and Surgeons of Canada on October 31 1936 in Ottawa honorary fellowship was conferred on Lord Tweedsmuir Governor General of Canada and on Dr Henry A Christian Hersey Professor of the Theory and Practice of Physic Harvard University and Physician in Chief Peter Bent Brigham Hospital Boston Mass

COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1935  
AND SEVEN YEAR AVERAGE

MONTH ENDING NOVEMBER 7, 1936

Diseases	1936				Average cases reported for week corresponding to Nov 7 for past seven years	1935			
	Week ending Oct 17	Week ending Oct 24	Week ending Oct 31	Week ending Nov 7		Week ending Oct 19	Week ending Oct 26	Week ending Nov 2	Week ending Nov 9
Actinomycosis	—	—	—	1	—	—	—	—	1
Amebiasis	—	—	1	—	—	1	—	—	—
Chickenpox	23	77	41	101	77	38	83	79	172
Conjunctivitis Infectious	—	—	2	—	—	—	—	2	—
Diphtheria	2	2	2	3	11	5	6	5	2
Dysentery Bacillary	5	1	2	5	1	3	—	—	—
Encephalitis Epidemic	—	—	—	—	—	—	—	1	—
Favus	—	—	—	—	—	1	—	—	—
German Measles	2	5	1	12	1	7	5	—	9
Influenza	3	—	—	3	2	2	—	9	1
Malaria	—	—	1	—	—	—	—	—	—
Measles	8	8	12	36	36	38	58	66	32
Meningococcus Meningitis	1	—	—	—	1	—	—	—	—
Mumps	17	37	40	45	34	20	22	16	70
Paratyphoid Fever	1	3	1	3	—	—	—	—	—
Pneumonia (Broncho)	12	19	21	34	20	12	15	7	16
Pneumonia (Lobar)	18	26	17	35	21	12	18	12	15
Poliomyelitis	1	2	—	—	3	17	9	7	7
Scarlet Fever	15	34	33	50	40	24	44	30	32
Streptococcus Sore Throat	2	2	—	—	1	3	3	1	1
Trachoma	—	1	—	1	—	—	—	—	—
Trichinosis	—	—	—	—	—	1	—	3	—
Tuberculosis (Pul ,	21	29	18	18	24	22	17	28	24
Tuberculosis (O F)	1	—	1	1	2	—	—	2	2
Typhoid Fever	1	6	—	—	4	5	1	2	1
Undulant Fever	1	1	1	1	—	2	1	2	4
Whooping Cough	48	74	73	96	46	65	49	71	68
Gonorrhea	41	29	34	50	34	37	43	61	32
Syphilis	63	38	46	45	50	43	62	63	38

Remarks No cases of Asiatic cholera, glanders, plague or yellow fever during the past seven years

## DR MAUDE ABBOTT HONORED

On October 23 the doctorate of laws of McGill University was conferred on Dr Maude Abbott, formerly professor in the faculty of medicine

## THE APPOINTMENT OF MISS MULVILLE

Miss Josephine A Mulville has been appointed Superintendent of the New England Hospital for Women and Children

Miss Mulville has been serving as assistant superintendent and principal of the school of nursing at the Beth Israel Hospital. She has had a long experience in administrative positions since her graduation from the Massachusetts General Hospital School of Nursing in 1913, for she was, for two years,

the night supervisor of the obstetrical department of the Holyoke City Hospital, for one year assistant superintendent of nurses in the Brooklyn Hospital, New York four years as superintendent of the Framingham Hospital three years as superintendent of nurses at the Indianapolis City Hospital, and in the World War twenty-two months in the Base Hospital No 6

The New England Hospital for Women and Children is fortunate in securing Miss Mulville

## CHIROPODY"

Under the Massachusetts statute Chiropody means the external treatment of the structures of the human foot by medical, mechanical or surgical means without the use of other than local anes

thetics. Any person who practices chiropody in this State, with the exception of United States army, navy or marine surgeons and duly registered physicians, must be licensed as a chiropodist. The licensing and regulations of chiropodists is in the jurisdiction of the Board of Registration in Medicine

Because of this law, care should be taken in the advertising and rendering of services of shoe experts who are not licensed as chiropodists. As the law indicates, shoe fitters have no right to give external treatments of the structures of the human foot by medical mechanical or surgical means—*Bulletin, Boston Better Business Bureau, Vol IX, No 17*

#### THE RIBERI PRIZE AWARDED TO DR. PENTIMALLI

The Riberi Prize founded by an Italian surgeon has been awarded to Dr Francesco Pentimalli, professor of general pathology at Florence, for his work on experimental tumors and cancer

#### RECENT DEATH

PHILLIPS—FRANK ELMER PHILLIPS, M.D. of North Chelmsford Massachusetts, died August 27 1936

Dr Phillips was born in 1871 and graduated from the College of Physicians and Surgeons of Baltimore in 1903. He was a Fellow of the Massachusetts Medical Society and the American Medical Association

#### NOTICES

##### A WARNING TO PHYSICIANS

The Massachusetts Medical Society has been advised by the Boston office of the United States Secret Service, Division of the Treasury Department to warn all physicians to be on the lookout for a man who has been victimizing the physicians in New York City

He is described as being short, heavy set, 5 ft. 8 in tall, weight about 212 lbs., age about 39 years, black hair and brown eyes. He is said to speak with a pronounced Greek accent and, so far in his dealings, has used the name of George Alexander. His procedure is to consult the physician for a physical examination and upon completion of this give a counterfeit twenty-dollar bill in payment. This bill is said to be a dangerous counterfeit and suspicious physicians should carefully note the serial numbers which may be rather light in color and somewhat irregular both as to impression and alignment

Physicians are asked to notify the nearest police officer and request him to get in touch with the Secret Service office in Boston

#### ANNOUNCEMENT

MILAN H. ROYCE, M.D. announces the opening of an office at 660 Main Street, Melrose, Massachusetts

#### CORRECTION

November 12, 1936

Editor, *New England Journal of Medicine*,

Dr Necheles has called my attention to the fact that in the abstract of his article on the 'Action of Oil of Peppermint on the Secretion and Motility of Stomach in Man' which was printed on page 718 of the October 15 issue of *The New England Journal of Medicine*, I inadvertently used 'healing time' instead of 'emptying time'

The statement should have read "They find that it tends to decrease the secretion of acid and that the emptying time is shortened"

I will appreciate it if you would print this letter in order to correct this unfortunate mistake

Very truly yours,

EDWARD S. EMERY, JR., M.D.

319 Longwood Avenue Boston.

#### LAWRENCE CANCER CLINIC

Established April 17, 1928

Lawrence, Mass., November 18, 1936

To the Physicians of the North Half of Essex County

Dear Doctor

The regular Lawrence Cancer Clinic, to be held at Lawrence General Hospital, 1 Garden Street Lawrence upon Tuesday December 1 at 10 00 a. m., will be a Demonstration Clinic, for physicians, with Channing C. Simmons, M.D. of Boston, Associate in Surgery in the Graduate Courses in Medicine at Harvard University Medical School, Surgeon-in-Chief to Collis P. Huntington Memorial Hospital, member of the Cancer Commission of Harvard University Boston, and Visiting Surgeon to the Massachusetts General Hospital, present as consultant. You are invited to accompany any of your patients whom you desire shall have this service, or to send them with a note, and a report will be returned to you. The service is gratis. Your attendance at the Clinic is always welcome.

This clinic is endorsed by the Committee on Postgraduate Instruction of the Massachusetts Medical Society

##### Committee

ROY V. BAKETEL, M.D.

CHAS. J. BURGESS, M.D.

JOHN J. MCARDLE, M.D.

HARRY H. NEVERS, M.D.

THOS. V. UNIC, M.D.

J. FORREST BURNHAM, M.D. Chairman

#### WACHUSETT MEDICAL IMPROVEMENT SOCIETY

A course of four lessons in Parliamentary Law for Physicians will be given at Holden District Hospital by Charles W. Proctor Esq. The first lecture will be Tuesday, November 24 1936 at 8 p. m., entitled 'Parliamentary Conduct of Members at Meetings'. Physicians who are not members and nurses, are invited to attend the course.

## REPORTS AND NOTICES OF MEETINGS

### THE NEW ENGLAND HEART ASSOCIATION

The first meeting of the New England Heart Association for this season was held at the Massachusetts General Hospital on Monday evening, November 9

#### THE SPEED OF HEALING OF MYOCARDIAL INFARCTION

Drs Paul White, Jorge Salcedo, and Kenneth Mallory presented a preliminary report on a study of the speed of healing of myocardial infarction. The following criteria were considered essential: (1) a clear history of only one attack of coronary thrombosis in the past with or without a new attack just prior to death, (2) a good description of the macroscopic appearance of the heart, or the availability of the heart itself for study, (3) a good histologic section of the infarct itself for detailed study. Only a small group of cases that fitted these criteria was discovered in their private records and in the clinic at the Massachusetts General Hospital. Hence further information was sought from some of the other large hospitals in Boston, the Peter Bent Brigham, the Boston City and the Beth Israel. Altogether some 95 cases were selected on closer scrutiny some of these will have to be omitted.

All the cases were divided primarily into groups according to the interval of time between coronary thrombosis and death. There were 5 patients who died during the first day, 6 during the second day, 7 during the third day, 5 during the fourth day, 5 during the fifth day, 2 during the sixth day, 4 during the seventh day, 22 during the second week, 7 during the third week, 7 during the fourth week, 7 during the second month, only 1 during the third month, only 3 during the fourth month, only 5 during the next eight months and 9 after one year.

The great majority of the 86 cases that died within one year were male, 66 in contrast to 20 who were female. The average age of the entire group was in the late 50s without much difference among the various subgroups designated above. Many of the deaths were sudden among the 86 who died during the first year 36 died suddenly, 32 died in congestive heart failure and the other 18 died of other causes. The majority of the infarcts were located in the region of the apex of the left ventricle and were large. The ratio of the acute infarcts at the apex of the left ventricle to those at the base among the patients dying within the first six months was approximately 10 to 1 and it was of interest that among a considerable number of those dying with acute infarction at the apex of the left ventricle there was an old healed scar at the base of the left ventricle with or without the clinical history of the past occurrence of such a lesion. Ten of the 86 cases dying within one year showed rupture of the heart wall, 8 had distinct cardiac aneurysms, 47 had intracardiac thrombi overlying the infarcted endocardium (large in 31), and 23 showed acute pericarditis. The heart weights

were above normal in nearly all, averaging somewhere about 500 grams in those who died within a year.

Macroscopically the infarct was described as dark red, purplish brownish red, or dark brown in practically all the cases dying within 2 or 3 months of the onset of illness, and as gray or white in those dying later. The weakest part, however, of the study to date appears right here, for there were only 6 cases in the very important and critical period between 2 months and 6 months after the onset of the acute illness. It was thought that it would be difficult to get many cases at this stage for evidently most patients who recover from the acute and subacute stages of myocardial infarction live out the rest of the year. The myocardial infarct was almost invariably soft in the first 3 months and the consistency was hard after 3 or 4 months.

The microscopic appearance of the infarct was discussed by Dr Mallory who had made an interesting test in each case by estimating from the appearance of the section, the length of time from the beginning of the lesion. He had graded them as follows: (1) the reaction and death of the heart muscle cells as the result of the blocking of the blood supply in the first 24 or 48 hours before the appearance of any invading cells, (2) the invasion of multitudes of white cells which come to clear away the debris of the very necrotic myocardium during the first week after the initial 24 to 48 hours, (3) the stage of rapid disappearance of the damaged muscle cells and replacement of polymorphonuclear cells by mononuclears, and new vascularization of the infarct in the second week, (4) the laying down of the scar with the beginning of the appearance of collagen in the third and fourth weeks and (5) the complete healing of the scar with much collagen after 2 or 3 months.

Dr Mallory has been able to estimate the age of the infarct quite accurately in this way provided he is given a section from near the periphery of the fresh infarct. He has found considerably delayed healing in the center of a large infarct.

In conclusion this preliminary study supports the clinical impression that fairly complete healing of an uncomplicated myocardial infarct of average size takes place in the course of 2 months.

Dr White next reported a new record in longevity after coronary thrombosis in the case of a clergyman dying at 73 years of age of congestive heart failure who had his first attack of coronary thrombosis at the age of 48, a second attack at the age of 51, a third attack at the age of 59, and a fourth attack at the age of 63. He died in the twenty-fifth year after the first attack of coronary thrombosis. Postmortem examination showed multiple areas of infarction of the left ventricle.

Dr White also reported the case of a woman 22 years old with myocardial infarction indicated by clinical and electrocardiographic evidence in the second month of pregnancy. There has been complete



and satisfactory convalescence without interruption of normal pregnancy. This is apparently the youngest woman ever known to have had coronary thrombosis.

#### CORONARY DISEASE IN YOUTH

BY R. EARLE GLENDY, M.D., AND PAUL D. WHITE, M.D.

This report deals with a comparative study of serious coronary disease (coronary thrombosis or uncomplicated angina pectoris) in a considerable number of persons under the age of 40 years: first with those of all age groups who have had serious coronary disease and secondly with a group of some 300 very old persons ranging in age from 80 to 105 years and for the most part in good health. A comprehensive questionnaire has been used to obtain data regarding place of residence, race, stock, family history, occupation, nervous strain, diseases, personal hygiene and habits, diet, body build and economic status. The male sex is overwhelmingly the victim of coronary disease in early life. Residence among the young group was almost wholly urban in contrast to the aged folk who have resided in town or country. Five cases of coronary thrombosis under the age of 30 were of Jewish ancestry. The ancestral longevity in the young group was as anticipated less than in the aged group. Occupations were more sedentary, nervous strain and sensitiveness more prevalent and tobacco and alcohol were used more freely among the young group. The older group claims to have eaten more moderately and exercised with greater regularity. Very few of either group were fat. The two groups for the most part claimed to be of moderate means. Infections do not seem to play much of a role in the production of serious coronary disease.

The percentage of survivors is greater and the duration of survival longer, other things being equal, in cases of coronary thrombosis before the age of 40 than in cases of coronary thrombosis of all age groups.

#### THE EFFECT OF TOBACCO SMOKE ON THE ELECTROCARDIOGRAM

Dr. Ashton Graybiel discussed electrocardiographic changes following the inhalation of tobacco smoke. He had found that 20 of 45 individuals tested showed some modifications of the QRS and T waves and of the PR interval. These modifications are usually small but exceptionally there is flattening or inversion of the T waves in Lead 1 or Lead 2 and in crease of the PR interval beyond the normal. These changes he ascribed to the characteristic action of nicotine on the autonomic ganglia.

#### THE HEART FIFTEEN TO TWENTY YEARS AFTER SEVERE DIPHTHERIA

BY WILLIAM PAUL THOMPSON, M.D.

Ten years ago Jones and White examined 100 people who had had severe diphtheria 5 to 8 years before and found no evidence of heart disease on examination or of conduction disturbances in the electrocardiograms. Ninety-four of these cases have

been followed recently. Two are dead, one of rheumatic heart disease and one of pneumonia. Two are well according to their own statements. Ninety we have now re-examined. An additional group of ten people who had diphtheria of similar severity at the same time has been examined so that the present total of examined cases is again 100. Two of these have rheumatic heart disease and two have mild hypertension. The others are clinically well. None have A-V block. Four have questionable widening of the QRS complexes with prominent or slurred S-waves in lead II. In two of these cases there has been no change in the electrocardiogram since 10 years ago while in the other two the width has increased very slightly. These four electrocardiograms are still only suggestively abnormal.

It is very unlikely that diphtheria is responsible for progressive changes in the heart resulting in the delayed appearance of heart block.

#### THE ELECTROCARDIOGRAM IN THE NEWBORN INFANT WITH SPECIAL REFERENCE TO THE TECHNIC AND TO THE CHEST LEAD

BY ROBERT EARLE GLENDY, M.D. AND  
MARGARET MORIARTY GLENDY, M.D.

The difficulties encountered in taking electrocardiograms on infants and small children can be minimized with the use of special infant electrodes and straps which fit snugly, insuring good electrical contact and causing less restraint and struggling than is encountered when the heavy adult electrodes are used. Infant electrodes of the same material and proportions as those now in common use for adults may be obtained cheaply. Small elastic or rubber straps of suitable size for the extremities and chest may be easily improvised.

In a series (to date) of 69 newborn infants at the Baker Memorial Hospital Nursery, ranging in age from 2 to 17 days, right axis deviation and slight sinus arrhythmia have been invariably present. The average pulse rate has been 150, with extremes of 100 (in one child who was jaundiced) and 187.

The average size and duration of the various complexes in the conventional leads have been much less than the corresponding average figures in adults due to the smaller heart size and the rapid rate.

The chest lead in the newborn infant differs in no essential way from that of adults except for the T waves which in about 60 per cent of the cases show an upright phase (occasionally diphasic) averaging +2.1 mm above the isoelectric level. About 25 per cent are downwardly directed (averaging -1.5 mm below the isoelectric level) and the remainder are either flat or very poorly marked.

#### THE GROWING IMPORTANCE OF CARDIAC NEUROSIS

Dr. White concluded the meeting with a statement concerning the growing importance of cardiac neurosis. The more heart disease there is and especially the more widespread the publicity about it, the more important is the problem of cardiac neurosis or

cardiac psychoneurosis which is not to be confounded with neurocirculatory asthenia

Cardiac neurosis is always based on some very definite exciting factor such as the occurrence of heart disease especially heart deaths among family and friends, or simply reported in the newspapers under dramatic headlines, the finding by a physician of a heart murmur, trivial or not, of some disturbance of rhythm which may be insignificant of hypertension great or small, or of actual heart disease. The findings on x ray examination or in the electrocardiogram have in some cases initiated a cardiac neurosis. Subjective sensations may be the starting point, a disagreeable extrasystole, a paroxysm of tachycardia, the manifold symptoms of neurocirculatory asthenia, sighing respiration, true dyspnea, angina pectoris, the prolonged pain of coronary thrombosis and various pains in the center or left side of the chest of noncardiac origin, due to cardiospasm, bursitis, muscle strain, and pleurisy among others.

The most difficult cases are those with serious heart disease complicated by cardiac neurosis. Dr. White stated that it was a common experience in his practice that nervous prostration or a severe cardiac psychoneurosis following coronary thrombosis especially in physicians, was often more difficult to treat than the myocardial infarction itself.

#### FAULKNER HOSPITAL CLINICAL MEETING

The regular monthly clinical meeting was held at the Faulkner Hospital on Thursday afternoon, November 5, at 5 00 p m.

The first case which had come to autopsy that was brought up for discussion was that of an eighty three year old woman who had given a history of indigestion for some years for which she had taken an appreciable amount of patent medicine and consulted many doctors, frequently more than one at a time but had rarely followed their advice and had specifically refused to follow the recommendations of her last physician which were to have her come into the hospital for study.

Six days before entrance she began to vomit and had epigastric pain and diarrhea. The epigastric pain and diarrhea soon subsided but the vomiting persisted.

The physical examination showed a small, emaciated, old woman with a dry tongue and an abdomen which was not distended although some high pitched peristaltic sounds were heard on auscultation. Her blood pressure which formerly had been elevated was 112 systolic over 68 diastolic. The urine showed a large amount of albumin and casts with a trace of acetone. There was a mild leukocytosis and no appreciable anemia. The vomitus was brownish in color and had a fecal odor. The stools showed some occult blood. Her blood sugar was just above the normal limits but the nonprotein nitrogen showed 200 mgm per 100 cc.

An attempt to study the gastrointestinal tract with barium enema was unsuccessful because the barium could not be retained and it was impossible

to insert it beyond the sigmoid flexure. A picture of the abdomen showed distended loops of small intestine. The extreme right side of the patient's abdomen was not seen on the film.

The diagnosis rested between an intestinal obstruction, presumably fairly high because of the increased nonprotein nitrogen in the blood, or a terminal uremia. It was difficult to understand why the abdomen was not more distended if it was an intestinal obstruction. The patient quickly succumbed after her entrance to the hospital and at autopsy there was an obstruction in the small intestine near the ileocecal valve caused by a large gallstone which had entered the intestine through a fistula between the gallbladder and the duodenum. The kidneys were found in fairly satisfactory condition for a person of her age. Although the gallstone obstructed the bowel, it at times permitted gas to pass by which accounted for the lack of distention.

The second case was that of a man forty seven years of age who had been running a fever for a year and gradually losing flesh and strength. In the past he had had dysentery and malaria, and there was a question of tuberculosis as a cause for his father's death.

His illness started with pain in the right shoulder which did not cause limitation of motion, nor was it aggravated by motion. At this time he found that he tired more easily and that he was running a fever which ranged from 99° to 103°.

Finally an x ray picture of the chest was taken which showed a shadow at the right apex. It was thought that the patient probably had tuberculosis and for two months he stayed in bed without improvement, during which time he gradually lost thirty pounds in weight. There was no cough or expectoration. There were night sweats which might have been due to medication. After 3 months on this program he came to the hospital for more elaborate studies. The only positive findings on physical examination in addition to the loss of weight were slight clubbing of the fingers and the fact that the right chest at the apex region did not move so much as the left on deep inspiration.

The routine clinical pathology, except for a mild secondary anemia and a mild leukocytosis, was entirely negative. Blood cultures were negative. The Hinton test was negative. The agglutination tests for tularemia and undulant fever were negative. An unsatisfactory sputum specimen showed no tubercle bacilli. The skin tuberculin test was negative.

A great number of x ray pictures were taken, all of which were negative except for a shadow of consolidation at the right apex which did not involve any of the bony structures, an enlarged liver according to a flat film of the abdomen and a gallbladder which did not fill after taking the dye by mouth. At this time tuberculosis was considered the correct diagnosis by some, and some type of neoplasm, possibly Hodgkin's disease by others. On the faint chance that there might be a liver abscess associated with the old dysentery or more involvement of the gallbladder than was apparent clinically, it

was decided to explore the abdomen, although it was generally felt that the lesion at the right apex was too extensive to be just a healed process. At the exploration the liver was found to be essentially normal and the gallbladder only very slightly thickened and obviously not the cause of his illness.

A month after admission to the hospital the shadow at the right apex was possibly slightly larger than on admission. It was decided to look upon this as a growth and presumably not of the Hodgkins variety, because at the exploration careful search for lymphoid overgrowths was made and none found. Accordingly x ray therapy was tried without immediate results and an x ray of the chest 2 months later showed the shadow certainly no smaller and possibly larger, so further x ray therapy was given up.

The patient continued to go downhill and died 4 months later with marked emaciation pronounced secondary anemia, ascites and hydropericardium and edema of the hands and feet, all of which were presumed to be terminal conditions associated with the chemical changes in the body fluids associated with his illness.

At autopsy there was found a carcinoma at the right apex which was markedly necrotic but contained no cavities. This carcinoma originated either from the epithelium of the smaller bronchi or was alveolar in origin. There is still some dispute on this point. It had extended through the pleura and invaded the bones in that vicinity but the invasion of the bones was apparently a development in later months because there was no evidence of bony destruction in the x ray pictures taken 4 months before his death. There was no evidence of metastasis. There was a small amount of microscopic tuberculosis in one of the lymph glands at the hilus of the lungs but it was felt that this was of no practical importance. No cause for the ascites or hydropericardium was found at autopsy.

At the last examination by x ray there was a suggestion of cavitation in the dense shadow caused by the tumor. At autopsy there were many emphysematous blebs in the lung tissue surrounding the tumor which may have caused this appearance by x ray. The striking feature of tumors of this type is the fever and destructive effect upon nutrition caused apparently by the absorption from the necrotic material in the tumor. As pain had developed in the shoulder suggesting invasion of nerves before the fever was discovered it seems that this case was hopeless from the start so far as surgical intervention is concerned.

Following the discussion of these two unusual and interesting cases Dr Harlan F. Newton talked about the practical application in thoracic surgery of the recent advances in diagnosis and treatment. Before doing so however he showed x ray pictures from two cases of neoplasm of the lung which started in the alveoli and emphasized the long continued fever which had existed in these cases. The clinical picture was very similar to that in the case

just presented, although the tumor was in a slightly different part of the lung.

Dr Newton divided the problems of thoracic surgery into cases with inflammation and tumor and emphasized the fact that improvement in making an early diagnosis and in localizing the lesions and mechanical aids in treatment were tremendous factors in the advances made in this type of surgery.

He called attention to the importance of paying attention to a persistent cough, especially one with a wheeze associated with it. Coughs should also be studied from the point of view of whether they are dry or productive. An unproductive cough which lasts any appreciable time calls for intensive study. Bleeding is a very important symptom in tumor of the lung and occurs in a much higher percentage of tumor cases than in cases of tuberculosis.

In studying diagnostic problems in the lung one should not rely only upon the routine x ray examination, but must have pictures taken from a variety of angles and must depend in addition upon the fluoroscope.

Dr Newton was especially enthusiastic about the value of lipiodol injections for localizing the lesion and showed a very striking x ray photograph after lipiodol injection of a bronchiectasis localized in one lobe of the lung behind the heart so that it did not appear in the usual x ray photograph. This patient was relieved by removal of the lobe.

He mentioned the importance of bronchoscopic study not only for diagnosis but also for treatment and called attention to the value of thoracoscopy for diagnosis and also for aid in cutting adhesions to make collapse of the lung more complete in certain cases.

The progress of anesthesia has aided appreciably in the operative procedures upon the lungs.

He likes to think of tuberculosis as a disease that is somewhat destructive but also in its reaction proliferative and therefore has a chance to heal itself without removing the destroyed products.

The pyogenic infections are usually destructive and the products of these organisms must be removed.

In abscess of the lungs he believes in conservative treatment during the acute stage and considers that the acute stage should be considered to last from 6 to 9 weeks.

Collapse therapy is of value not only in tuberculosis but also in pyogenic infections.

He mentioned figures to show that tuberculosis in young people in their teens usually resulted fatally in about 85 per cent within 10 years showing that immunity is poor at that age. If the outlook is so poor for these patients he feels that it is well worth while to try some form of collapse therapy either pneumothorax or removal of the ribs to give these young patients a better chance.

While the tuberculosis is acute major surgery should be avoided.

In chronic tuberculosis with cavitation some type of collapse is of distinct value and Dr Newton mentioned a case of a fifty nine year old patient who

had had a cavity with tubercle bacilli in the sputum for years without being able to heal the cavity, and after collapse therapy by removal of some ribs over the apex area the cavity had very promptly and entirely disappeared. The type of operation which is going to be used depends definitely upon the extent of the process and its location in the lungs in chronic tuberculosis. If the process is extensive there must be one lobe of the lung which is definitely shown to be free from activity by x ray before surgery is undertaken, otherwise a tubercular bronchopneumonia will probably develop in the part of the lung which is least involved.

He called attention to the fact that lobectomy in properly selected cases does not show any higher mortality than that seen in operations upon acute appendicitis and therefore the early diagnosis of neoplasms is essential. It is also important in bronchiectatic conditions confined to one lobe to consider the removal of the lobe before the process becomes more diffuse in the lungs.

#### BOSTON PATHOLOGICAL SOCIETY

The Boston Pathological Society met at the Harvard Medical School Wednesday evening, October 28 1936, Dr J B Hazard presiding. Dr E A. Codman spoke on the subject "A Study of the Cases in the Registry of Bone Sarcoma of Giant Cell Tumor about the Knee." He spoke of several untreated cases of such tumors that were alive and well twelve and twenty six years after the diagnosis was made apparently with little deformity, and with good function of the leg.

A study of the growth characteristics of these tumors has shown that only rarely do they spread upwards into the tubular portion of the bone and that they are usually limited to the cancellous portion near the old epiphyseal line. Two important characteristics of giant cell tumors were cited. They almost always stop abruptly with a convex border at the margin of the cancellous portion of the bone (or at the metaphyseal line). They expand the wall of the bone and are easily shelled out with the finger at the time of operation. The cartilage of the joint is not destroyed. These facts have led Dr Codman to believe that giant cell tumors are a form of compound arteriovenous aneurysm. He considers the giant cells to be in reality connected together while red blood cells circulate freely between their anastomosing processes. This belief is strengthened by the observation that pulsations of the tumor mass occur coincident with the heart beat, and that injection of the arterial system of the leg causes the tumor to be diffusely filled with the injection mass. He does not consider the giant cells to be malignant and stated that all the cells observed in these tumors are found in normal granulation tissue.

In discussing the treatment of these tumors Dr Codman pointed out the futility of implanting bone chips in the cavity after curetting out the tumor since they are completely resorbed. This resorption

occurs because the chips do not lie in any line of stress and the normal body processes are called into action to remove them in the same way that any foreign body is removed. He advised a new operation in which a flap of the periosteum is placed in the cavity after thorough curetting and establishment of absolute hemostasis. He does not fear leaving some of the giant cells behind since he does not regard them as malignant. X rays of a case treated in this manner were projected showing marked filling in of the defect with solid bone, a condition that never would occur spontaneously because of the destruction of the endosteum by the expanding tumor.

Fractures through these tumors should not be considered as an indication for amputation. In some cases fractures have been known to initiate a healing process perhaps because of shutting off the blood supply to the aneurysm. X ray treatment in some cases may produce a similar result.

Giant cell tumors never metastasize. Some 10 per cent undergo malignant change, however, and may cause death because of metastases as sarcoma. Such malignant degeneration is probably brought on by operative interference with the tumor, especially if it be repeated.

Following Dr Codman's address the meeting was adjourned to an inspection of the histories, x rays and specimens of the cases from the Registry of Bone Sarcoma and to informal discussion.

#### THE NORFOLK DISTRICT MEDICAL SOCIETY

A stated meeting of the Society will be held in the Beth Israel Hospital, Tuesday, November 24, 1936, at 8 p m. Telephone Beacon 4400.

Business meeting 8 00 p m

Communications 8 15 p m

Clinical Significance of Coronary Artery Anastomoses—Dr Monroe J Schlesinger

Clinical Significance of Insufficient Coronary Blood Flow—Dr Herrman L Blumgart

Medicinal Treatment of Angina Pectoris—Dr J E F Riseman

Tobacco and Alcohol in Angina Pectoris—Dr Louis Wolff

Effect of Intravenous Fluid on the Cardiovascular System—Dr Mark H Altschule

Pulmonary Complications in Raynaud's Disease—Dr Harry Linenthal

Each speaker will occupy twelve minutes

Collation

FRANK S CRICKSHANK M D, *Secretary*  
1247 Beacon Street, Brookline

#### MIDDLESEX SOUTH DISTRICT MEDICAL SOCIETY

The next meeting of this Society will take place on Wednesday, November 25, at the Middlesex County Sanatorium, Trapelo Road, Waltham.

The speaker is Dr Cole B Gibson, Superintendent and Medical Director of the Meriden State Tuberculosis Sanatorium.

Dr Gibson is an outstanding worker in the field

of Tuberculosis He comes from Connecticut and will deliver a talk that will be most instructive It is the hope of the officers that a large audience will be present

Luncheon will be served at 12 15 p m.

Those attending may be reached by telephone the number is Waltham 4600

SUMNER H REMICK M.D. *President*  
ALEXANDER A LEVI M.D. *Secretary*

#### ESSEX SOUTH DISTRICT MEDICAL SOCIETY

The next meeting of the Essex South District Medical Society will be held Wednesday December 2 1936 at the Salem Hospital

Clinic at 5 p m

Dinner at 7 p m

Speaker Dr John W Strieder Associate Professor of Chest Surgery at Boston University School of Medicine

Subject Pulmonary Suppuration

R. E STONE, M.D. *Secretary*

#### AMERICAN COLLEGE OF SURGEONS

The annual Clinical Congress of the American College of Surgeons will be held in Chicago October 25 29 1937

#### THE NEW ENGLAND HOSPITAL ASSOCIATION

The New England Hospital Association is having its Fifteenth Annual Meeting at the Hotel Statler Boston, Massachusetts on February 25 26 and 27, 1937

A. G. ENGELBACH M.D., *Secretary*

#### HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheater (Shattuck Street Entrance) Tuesday evening November 24, at 8 15 p m

##### PROGRAM

##### Presentation of Cases

Studies of Renal Physiology By D D Van Slyke, The Hospital of the Rockefeller Institute for Medical Research

Professor A. Baird Hastings will preside

Medical students and physicians are cordially invited to attend.

MARSHALL N FULTON, M.D. *Secretary*

#### PHARMACOPOEIAL HEARING IN WASHINGTON

A meeting of those interested in the revision of U S P XI monographs will be held at the Hotel Washington Washington D C on Monday November 30 1936 The sessions will be called at 10 a m and 2 p m

#### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

##### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY NOVEMBER 23 1936

Tuesday November 24—

11 30 a m Massachusetts General Hospital Executive Conference

- 1 p m Massachusetts Society for Mental Hygiene Twentieth Century Club 3 Joy Street Boston
- 3 p m Norfolk District Medical Society Beth Israel Hospital Boston
- \*8 15 p m Harvard Medical Society Peter Bent Brigham Hospital Amphitheater (Shattuck Street entrance)

##### Wednesday November 25—

- 8 a m Massachusetts General Hospital Grand Rounds Orthopedic Department
- \*1 a m - 10 a m Boston Dispensary 25 Bennett Street Boston. Hospital Case Presentation Dr S J Thannhauser
- 11 2 m Clinico-Pathological Conference Children's Hospital Amphitheater
- 4 p m - 5 p m Surgical Pathological Conference Dr Cutler and Dr Wolbach Peter Bent Brigham Hospital.

##### Friday, November 27—

- \*1 a m - 10 a m Boston Dispensary 25 Bennett Street Boston Practical Considerations of the Cancer Problem Dr Robert B Greenough
- 10 a m Massachusetts General Hospital Fracture Rounds
- 12 m Massachusetts General Hospital. Clinical Meeting of the Staff of the Children's Medical Service Ether Dome

##### Saturday November 28—

- \*9 a m - 10 a m Boston Dispensary 25 Bennett Street Boston Hospital Case Presentation Dr S J Thannhauser
- \*10 a m - 12 m Staff Rounds at the Peter Bent Brigham Hospital Conducted by Dr Henry A. Christian.

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

November 19—Medical Clinic, Peter Bent Brigham Hospital 3 30 p m

November 20—New England Roentgen Ray Society 8 15 p m Boston Medical Library 8 Fenway

November 24—Harvard Medical Society See notice elsewhere on this page

November 24—Wachusett Medical Improvement Society See page 997

November 24—Massachusetts Society for Mental Hygiene 1 p m Twentieth Century Club 3 Joy Street Boston

November 30—Pharmacopoeial Hearing in Washington See notice elsewhere on this page

December 1—Lawrence Cancer Clinic See page 997

December 2—New England Obstetrical and Gynecological Society University Club Boston

December 3 5—Annual Conference of the National Society for the Prevention of Blindness Columbus Ohio

December 10—Pentucket Association of Physicians Hotel Bartlett 95 Main Street Haverhill at 8 30 p m

December 11—William Harvey Society Auditorium Beth Israel Hospital Boston 8 p m

December 15—Massachusetts Eye and Ear Infirmary Monthly Clinico-Pathological Conference See page 949

February 25 26 27 1937—The New England Hospital Association See notice elsewhere on this page

March 30 April 2, 1937—First International Conference on Fever Therapy Postponement notice See page 52

April 21 24 1937—American Society for Experimental Pathology See page 1075 issue of May 21

October 25 29 1937—American College of Surgeons See notice elsewhere on this page

#### DISTRICT MEDICAL SOCIETIES

##### ESSEX SOUTH DISTRICT MEDICAL SOCIETY

December 2—See notice elsewhere on this page

##### FRANKLIN DISTRICT MEDICAL SOCIETY

Will meet at the Weldon in Greenfield at 11 a m the second Tuesdays of January March and May

CHARLES MOLINE M.D. *Secretary*

##### Sunderland

##### MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

January 13 1937—Bear Hill Golf Club Stoneham

March 16 1937—Danvers State Hospital Danvers

May 11 1937—Bear Hill Golf Club Stoneham

KENNETH L MACLACHLAN M.D. *Secretary*

1 Bellevue Avenue Melrose

##### MIDDLESEX SOUTH DISTRICT MEDICAL SOCIETY

November 25—See page 1002

##### NORFOLK DISTRICT MEDICAL SOCIETY

November 24—See page 100.

January 19, 1937—8 15 p m The Peter Bent Brigham Hospital Communications and Case Presentations by the Staff. Suggested title—Abdominal Pain from the Medical and Surgical Standpoint. Details of program to be announced.

February 23, 1937—Time, place and details of program to be announced

March 30, 1937—8 15 p m New England Deaconess Hospital. A Symposium on Diabetes entitled A Survey of the Diabetic Work of the George F. Baker Clinic in the New England Deaconess Hospital. Communications and Case Presentations by the Staff. Drs. Elliott P. Joslin, Howard F. Root, Priscilla White, Alexander Marble and Allen P. Joslin

May, 1937—Annual Meeting Details to be announced

Note The Censors will meet for the examination of candidates on the first Thursday of May 1937. Fee of \$10.00 is payable at the time of examination. Application blanks may be obtained by writing the Secretary, furnishing name, address and name of school of graduation in medicine. Application must be made at least three weeks prior to date of examination. Candidates whose applications are on file will receive proper notices

FRANK S. CRUICKSHANK M.D. Secretary  
1247 Beacon Street Brookline

#### PLYMOUTH DISTRICT MEDICAL SOCIETY

November 19—6 p m Goddard Hospital

January 21, 1937—11 a m Bridgewater State Farm,

March 18, 1937—11 a m Brockton Hospital

April 16, 1937—Annual Meeting 11 a m Ducey Hospital

May 20, 1937—11 a m. Lakeville State Sanatorium

FRED F. WEINER M.D. Secretary  
231 Main Street Brockton

#### SUFFOLK DISTRICT MEDICAL SOCIETY

January 27, 1937—Boston Medical Library 8 15 p m Joint Meeting with the Boston Medical Library Anthropology Dr. Carleton S. Coon

March 31, 1937—Boston Medical Library 8 15 p m Social Insurance—It Affects the Medical Profession. Dr. Charles E. Mongan Discussion Dr. Channing Frothingham

April 23, 1937—Annual Meeting Boston Medical Library 8 15 p m Problems in Surgical Diagnosis Dr. Howard M. Clute

CONRAD WESSELHOEFT, M.D., President  
CHARLES C. LUND M.D., Secretary

#### WORCESTER DISTRICT MEDICAL SOCIETY

December 9—St. Vincent Hospital, Worcester, Mass. 6 15 p m Dinner—complimentary by the hospital. 7 30 p m Business session and scientific program

January 13, 1937—Worcester City Hospital Worcester, Mass. 6 15 p m Dinner—complimentary by the hospital. 7 30 p m Business session and scientific program

February 10, 1937—Worcester State Hospital Worcester, Mass. 6 15 p m Dinner—complimentary by the hospital. 7 30 p m Business session and scientific program

March 10, 1937—The Memorial Hospital Worcester, Mass. 6 15 p m Dinner—complimentary by the hospital. 7 30 p m Business session and scientific program

April 14, 1937—Worcester Hahnemann Hospital Worcester, Mass. 6 15 p m Dinner—complimentary by the hospital. 7 30 p m Business session and scientific program

May 6, 1937—At 4 30 in the rooms of the Worcester Medical Library, Inc. at 34 Elm Street, Worcester, will be held the spring meeting of the Board of Censors

Wednesday Afternoon and Evening, May 12, 1937—Annual Meeting Time and place for this meeting will be announced in an early spring issue of the Journal.

ERWIN C. MILLER M.D., Secretary  
27 Elm Street Worcester

### BOOKS RECEIVED FOR REVIEW

Eugenical Sterilization A Reorientation of the Problem By the Committee of the American Neurological Association for the Investigation of Eugenical Sterilization 211 pp New York The Macmillan Company \$3.00

The Intellectual Functions of the Frontal Lobes

A Study Based Upon Observation of a Man After Partial Bilateral Frontal Lobectomy Richard M. Brickner 354 pp New York The Macmillan Company \$3.50

Modern Urology In original contributions by American authors Volume I. General Considerations—Diseases of Penis and Urethra—Diseases of Scrotum and Testicle—Diseases of Prostate and Seminal Vesicles Edited by Hugh Cabot Third Edition, Thoroughly Revised 951 pp Philadelphia Lea & Febiger

Modern Urology In original contributions by American authors Volume II. Diseases of the Bladder—Diseases of the Ureter—Diseases of the Kidney—Radiation Therapy of Tumors of the Genito-Urinary Tract. Edited by Hugh Cabot. Third Edition, Thoroughly Revised 862 pp Philadelphia Lea & Febiger

Textbook of General Surgery Warren H. Cole and Robert Elman 1031 pp New York and London D. Appleton Century Company \$10.00

Text Book of Pathology Sir Robert Muir Fourth Edition 994 pp Baltimore William Wood & Company \$10.00

A Practical Medical Dictionary Thomas Lathrop Stedman 1291 pp Thirteenth, Revised, Edition Baltimore William Wood & Company \$7.50

British Masters of Medicine Edited by Sir D'Arcy Power 242 pp Baltimore William Wood & Company \$3.00

Bailey's Text Book of Histology (Elwyn and Strong) Revised and Rewritten by Philip E. Smith 773 pp Ninth Edition Baltimore William Wood & Company \$6.00

Urological Roentgenology A Manual for Students and Practitioners Miley B. Wesson and Howard E. Ruggles 269 pp Philadelphia Lea & Febiger \$5.00

### BOOK REVIEW

An Introduction to Materia Medica and Pharmacology Hugh A. McGuigan and Edith P. Brodie 580 pp St. Louis The C. V. Mosby Company \$2.75

This book might be entitled "A Pharmacologist Revises a Nurses Textbook of Pharmacology." The revision is apparently a very extensive one, and the book is now really McGuigan's and not Miss Brodie's. McGuigan, in his preface, emphasizes the fact that pharmacologic teaching even to nurses should depend to great extent upon animal experimentation. A plea is also made for the use of standard preparations and for the diminution of obsolete and proprietary medications. The book in its present form is intensely practical, very readable, and might even be of value to medical students and physicians as well as to nurses—for whom it was primarily written. In some respects, particularly in readability, practicality, and excellence of illustrations, it surpasses standard texts of pharmacology. One has no hesitancy in recommending this book highly to the nurses teaching profession.

# The New England Journal of Medicine

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## THE AUTONOMIC PHARMACOLOGY OF THE GASTRIC JUICES\*

BY ABRAHAM MYERSON, M D,† MAX RINKEL, M D,† AND WILLIAM DAMESHEK, M D †

**W**E are presenting the following experiments because they have brought to light important new phenomena concerning the chemical activities of the stomach, especially as related to autonomic pharmacology. We do not intend in this presentation to enter into any elaborate theoretical discussion, since it does not seem to us that the present accumulated facts warrant generalizations.

In many respects the results we have obtained by human experimentation quite definitely contradict the rather chaotic results that have largely been built up by animal experimentation. The difficulty with translating the results of animal experimentation to human physiology are too well known to need elaboration. Fundamentally, the anesthesia and the emotional state the animal is thrown into by the experimentation, as well as the fact that various species differ from one another in important fundamentals of physiologic reaction, make the human application of these results precarious.

We believe our results to be quite valid because the experiments were carried out on human beings without any anesthesia and without any mutilation, such as is involved when sympathetic or parasympathetic fibers are cut, electrically stimulated or surgically handled in any way. The procedure in general has been to select patients with mental disease who are physiologically healthy so far as we can discover by any techniques of the present day. Mainly male cases of dementia praecox have been used that are known to us as to hematology, tuberculosis syphilis, infection in general, blood pressure, heart, kidney disease and basal metabolism. In fact, these individuals have been more conclusively shown to be physiologically healthy than most of the so called healthy subjects selected for experimentation in other clinics and by other investigators. Moreover, these patients are exceedingly docile, they submit themselves for experimentation time after time, during many years of study.

In this series of experiments we have balanced certain of the so-called parasympathomimetic and sympathomimetic drugs against one another, following along a line of experiments we have utilized in evaluating and attempting to understand blood pressure, gastrointestinal motility and other physiologic functions. The parasympathomimetic drug used was acetyl-beta-methylcholine chloride (mechoyl), the sympathetic stimulant was beta-phenyl-isopropylamine sulfate (benzedrine sulfate). We have used atropin to check and inhibit the effects of mechoyl and, because it removes the influence of the parasympathetic nervous system, to enhance the effects of benzedrine. Since the esterases of the body inhibit acetylcholine and thus inhibit the action of the parasympathetic nervous system, prostigmin and physostigmin, which inhibit the esterases, have been used to enhance the effect of mechoyl or to obtain parasympathetic stimulation. We fully realize that none of these drugs have any "pure" action and possibly it would be better to drop the terms parasympathetic and sympathetic entirely in the discussion of these experiments and speak of the effects of mechoyl, benzedrine, atropin and, as a group, prostigmin and physostigmin on the gastric secretions. The fact is, however, that irrespective of theory we have been able to change the quantity, alkalinity and acidity, pepsinogen content and mucin content of the stomach at will and consequently feel that our results add much that is striking and new in human physiology.

Elsewhere<sup>1</sup> we have shown that benzedrine relaxes gastric spasm. In a publication to appear shortly<sup>2</sup> we show that mechoyl rapidly and measurably increases the tone of the gastrointestinal tract. We have followed these facts as to tonus into the following experiments on stomach secretions.

### PROCEDURE

The patients came to the laboratory in the morning after a 16 hour fast. The gastric juice was obtained by means of a Levin's nasal tube which was readily inserted with the patient in the prone position. Uncooperative patients were not used. In general it was found that after one or two experiments our patients made ideal subjects for gastric intubation.

The whole amount of fasting juice was obtained

From the Division of Research Boston State Hospital aided by grants from the Commonwealth of Massachusetts the Rockefeller Foundation and the Herbert L. Celler Foundation.

†Myerson Abraham—Clinical Professor of Psychiatry Harvard University Medical School. Rinkel Max—Research Associate Boston State Hospital. Dameshek, William—Associate Physician, Beth Israel Hospital. For records and addresses of authors see "This Week's Issue" page 1043.

by repeated aspirations over a period of about 20 minutes. The tube being left in situ, an injection of one or more of the various drugs was then made subcutaneously. In a few experiments drugs were given by mouth. The following drugs were used: mecholyl (acetyl beta methylcholine chloride)\*, benzedrine sulfate (beta-phenylisopropylamine sulfate)†, atropin sulfate, physostigmin and prostigmin‡. These were given either singly or in various combinations according to the type of experiment planned. The dosage usually used was as follows:

Mecholyl	25 mg
Benzedrine sulfate	40 mg
Atropin sulfate	13 mg
Physostigmin	0.65 mg
Prostigmin	0.5 to 1 mg (12 cc of 1:2000 solution)

Following administration of the drug, gastric juice was aspirated at frequent intervals—every 2, 5 or 10 minutes, according to the aim of the experiment. Test meals were not given because we wished to obtain a secretion picture of these chemicals that was free from the physiologic reactions of digestion itself. This is in line with the work of Bloomfield and Pollard<sup>3</sup> on histamine. As much gastric juice was aspirated as could be obtained and the volumes recorded. The presence or absence of free hydrochloric acid was immediately tested for by Congo red paper. Litmus paper was used as a rough qualitative test for total acidity or alkalinity. Free hydrochloric acid was determined by titration with N/10 sodium hydroxide, using Topfer's solution as an indicator. Total acid was determined by further titration, using phenolphthalein as an indicator. Combined hydrochloric acid was determined by the method of Michaelis. The total hydrochloric acid was in most cases substantially the same as the total acid.

In those samples of gastric juice in which free hydrochloric acid was absent the degree of "acid deficit" was obtained. This was tested by titration with N/10 hydrochloric acid using Töpfer's solution as an indicator, hydrochloric acid being run in until the typical red color was obtained. The pH of the gastric juice was measured electrometrically in typical experiments using the Beckmannmeter.

Chlorides were analyzed in several cases by the Wilson and Ball method<sup>4</sup>. The pepsinogen content of the juice was determined in typical experiments by Mett's egg albumin tubes, using successive dilutions of gastric juice (1:2, 1:4, 1:8, 1:16), alkaline specimens being adjusted to the proper pH for peptic activity. Rennin determined in typical cases was found to be parallel with pepsinogen. The mucin content was estimated mostly by the presence or absence of a viscid appearance in the juice and by testing for some of the chemical manifestations of mucin, that is, alkalinity and a cloudy appearance with weak acids, such as dilute hydrochloric or dilute acetic acid.

A few control experiments showed that the presence of a tube in the stomach for the period of a typical experiment in itself produced no essential or comparable changes in quantity or chemistry of the stomach juices.

#### MECHOLYL

When this chemical is given subcutaneously in the dosage of from 25 to 40 mg, certain

general effects, which have been fully described in the literature and to which we have paid attention in a previous publication,<sup>5</sup> become quite marked—flushing of the face, neck, chest and back, sweating, which soon becomes profuse and alkaline, lacrimation, rhinorrhea, salivation; rise in pulse rate and fall in blood pressure.

In the gastric contents the following effects were regularly and invariably noted: (1) a marked increase in volume, (2) a great increase in mucin, (3) a sudden reversal within 2 to 8 minutes of the acid reaction to a definitely alkaline reaction, (4) disappearance of free hydrochloric acid with the production of a marked "acid deficit", (5) reduction in the combined acid and (6) disappearance of pepsinogen and rennin.

Chart 1 is that of a typical experiment and speaks for itself in respect to the quantitative and qualitative changes noted in the gastric juice. The sharp drop from acidity to alkalinity is graphically shown. The increase in quantity is, as will be noted, nearly double. What is not indicated by the chart is the marked and sudden appearance of mucin in large quantities and the complete disappearance of pepsinogen.

If we divided up the time of the experiment into the stimulation phase, during which time the mecholyl acts, and the recovery phase, at which time the gastric juice returns to normal, the various factors in the gastric contents from a group of ten cases may be analyzed as follows:

**Quantity.** Fasting Content. This varied from 16 to 182 cc.

**Stimulation Phase.** This lasted from 15 to 95 minutes, average 35 minutes, during which time both the full systemic effects of the drug and the striking effects on gastric juice were demonstrable. The total volumes varied from 78 to 350 cc. Secretion per minute varied from 3.1 to 12.1 cc, average 6.7 cc.

**Recovery Phase.** This lasted from 20 to 85 minutes, average 52 minutes. The total amount of juice removed during this time varied from 14 to 161 cc, the secretion per minute being estimated from 0.3 to 4.8 cc, average 1.9 cc.

**Free Hydrochloric Acid.** Fasting Content. Free hydrochloric acid varied from 8 to 68 units (cc of N/10 sodium hydroxide per 100 cc gastric juice). In one case, achlorhydria was present (acid deficit—18 units) and there was no appearance of hydrochloric acid following histamine stimulation.

**Stimulation Phase.** A striking diminution in free hydrochloric acid occurred in every instance, regularly beginning within the first 4 minutes. In one case in which continuous aspiration was done and the time recorded by stop watch, the disappearance of free hydrochloric acid occurred in 2 minutes, 37 seconds. The acid deficit reached its maximum between 5 and 15 minutes, average 10 minutes.

\*Furnished through the courtesy of Merck & Co. Inc. Rahway N. J.

†Furnished through the courtesy of Smith Kline & French Laboratories, Philadelphia, Pa.

‡Furnished through the courtesy of Hoffmann-La Roche, Inc. Nutley, N. J.



**Recovery Phase** Acidity gradually returned to normal in most instances, in a few cases the hydrochloric acid content was greater than that in the fasting juice (overcompensation) Free hydrochloric acid in the recovery phase varied from 2 to 50 units

The beginning of acid return varied from 14 to 98 minutes, average 41 minutes In one case (H H) in which the fasting contents showed 8 units of free hydrochloric acid, there was no return of acid at the end of 1 hour, 35 minutes In another case (E D), with achlorhydria of the fasting contents, hydrochloric acid did not appear at any time during the experiment

It should be noted that during the height of reaction there is a definite decrease in chlorides per 100 cc of gastric juice

**Total Acidity** This was practically coincidental with total free hydrochloric acid The titration of an anacid gastric juice, consisting essentially of mucin, is extremely difficult and subject to error We felt that the pH determinations were more satisfactory

**Mucin** This is the most striking reaction During the stimulation phase, the mucin completely dominates the visible picture of the gastric juice The clear gastric juice becomes

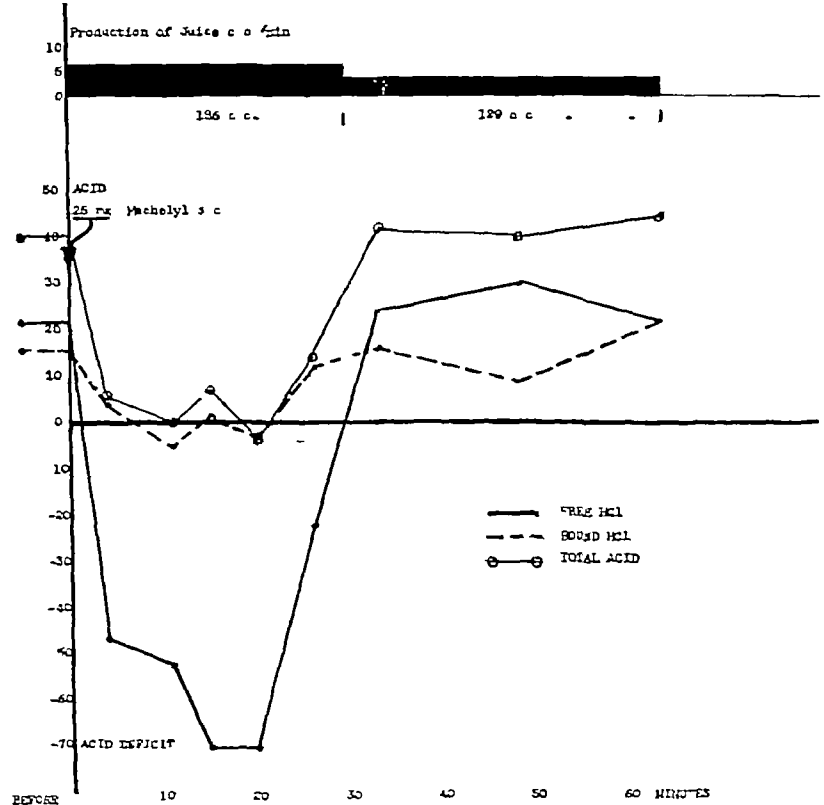


CHART 1  
Effect of Mecholyl on Gastric Juice

**Hydrogen Ion Concentration** The pH was determined in 2 typical cases This corresponded in all respects with the qualitative reactions obtained with litmus and Congo red and with the titration results

The pH increased in one case from 1.9 to 3.9 in the stimulation phase (15 minutes), returning in 33 minutes to 1.7, in the other case it increased from 2.56 to 8.95 in the stimulation phase (11 minutes), returning to 1.99 at the end of experiment (42 minutes)

**Chlorides** These were determined in 3 cases and showed the following results

	Before Stimulation Phase	Recovery Phase
(1)	485	438
(2)	597	402
(3)	679	641

484 mg/100 cc

514

676

cloudy and viscid during the stimulation phase and then quickly becomes clear again in the recovery phase

**Pepsinogen** This was determined in 9 cases There was always complete disappearance of pepsinogen during the stimulation phase, the pepsinogen returning to normal in the recovery phase, corresponding in all respects with the disappearance and reappearance of free hydrochloric acid.

The outstanding gastric effects of mecholyl are that the activity of the acid glands ceases entirely and mucin stimulation reaches an extraordinary maximum within a short period of time It is interesting to note, and we believe it to be important, that the intradermal injection of mecholyl probably gives a more vigorous

reaction than the subcutaneous use of the drug. Whenever mecholyl is given, even in minute doses, the trend is in the same general direction, that is, a diminution or disappearance of the digestive secretions, hydrochloric acid and pepsinogen, and finally the appearance of mucin.

*Iontophoresis of Mecholyl* Very interesting and corroborative is the result of iontophoresis. This experiment which is to introduce mecholyl ions into the body by the positive pole of the galvanic current was carried out as follows: a large electrode moistened with 5 per cent mecholyl solution was placed over the abdomen with the negative electrode on the patient's back. Ten milliamperes of current were used. After the lapse of 10 minutes the gastric juice, previously normal, turned alkaline and contained a considerable amount of mucin throughout the time

drochloric acid, total acids and pepsinogen. There was no mucin production. The quantity was not noticeably altered by benzedrine stimulation, but, if any change was present, it was in the direction of a slight diminution of juice. In most respects benzedrine stimulation resembles that of histamine except that the quantity is not increased. In contrast with histamine the patient felt no ill-effects during the experiment.

An analysis of the results on gastric secretion following the administration of benzedrine sulfate to a group of cases is as follows:

*Quantity* Fasting Content This varied from 12 to 178 cc.

*Stimulation Phase* (when acidity was either increasing or remaining at same level) The volumes collected during 43 to 110 minutes

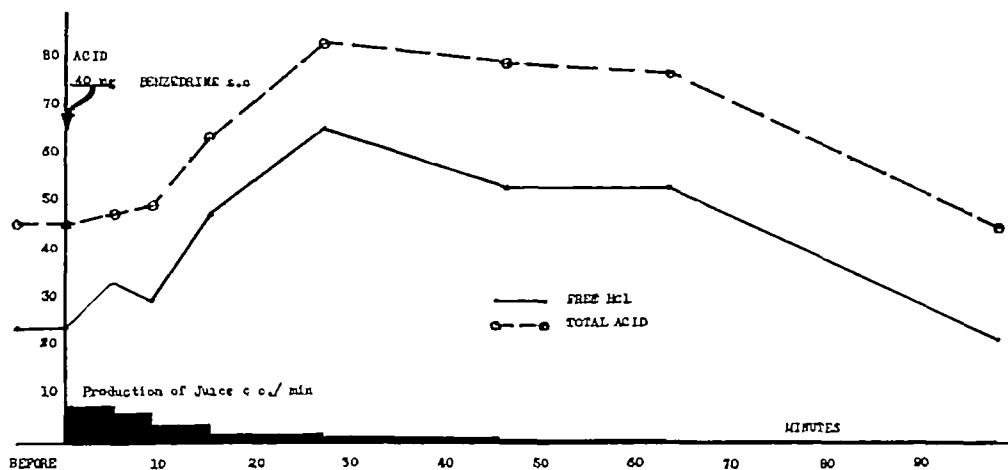


CHART 2  
Effect of Benzedrine on Gastric Juice.

of active iontophoresis. These changes disappeared when the experiment was completed and the gastric juice returned to its normal condition. We are not yet ready to report in any further detail on this experiment which will be the subject of a future communication. The general effects during the time of iontophoresis were relatively mild, blood pressure and pulse rate hardly changed. There was some degree of sweating and flushing but the patient was not, so far as we could learn, uncomfortable.

#### BENZEDRINE SULFATE

The administration of benzedrine sulfate subcutaneously in the usual dosage of 40 mg produced typical results. Though little general visible reaction took place, there was a definite rise in blood pressure associated, usually, with some slowing of the pulse rate. A comparison of the benzedrine results on the gastric secretion with those of mecholyl stimulation shows a striking contrast (chart 2). In general it may be stated that the digestive juice elements increased, that is, there was increase of free hy-

drochloric acid and the secretion rates per minute were 0.5 to 2.7 cc, average 1.4 cc.

*Recovery Phase* This was difficult to determine. We are not able to give exact pictures, but believe that there was no essential difference in quantity.

*Free Hydrochloric Acid* This always became increased.

*Fasting Content* In 6 cases that showed free hydrochloric acid the range was from 24 to 62 units.

*Stimulation Phase* In 3 cases an increase in free hydrochloric acid was noted from 38 to 64 units in 1 hour, 20 minutes, from 24 to 66 units in 26 minutes, from -12 to +8 units in 61 minutes. In 3 other cases, in which only the pH was determined, the results were as follows:

- (1) 16 to 12 in 25 minutes
- (2) 16 to 15 in 13 minutes
- (3) 17 to 26 in 69 minutes

In 4 cases with achlorhydria (not pernicious anemia) the fasting hydrochloric acid deficit was from 12 to 64 units. The hydrochloric acid

determinations after the benzedrine injections showed the following

- (1) -12 units to +6 in 41 minutes  
+8 in 60 minutes
- (2) -40 units to -26 in 42 minutes  
+20 in 1 hour 42 minutes
- (3) -64 units to -93 in 25 minutes  
-47 in 70 minutes
- (4) -28 to -12 in 41 minutes

Thus in the achlorhydria cases the acid deficit became raised to positive acid content in 2 cases and was diminished in the other cases

**Pepsinogen** This was determined quantitatively in 4 cases. There was a gradual increase in the digestive power of the pepsinogen pres-

in which the drug was administered subcutaneously, there was a marked reduction in acidity, as follows

- (1) +50 to -20 units in 57 minutes
- (2) +34 to -20 units in 65 minutes
- (3) pH 1.46 to 7.58 in 28 minutes

In these cases the mucin was increased

In the 4 cases in which the drug was given by mouth the results follow

- |                 |                                   |
|-----------------|-----------------------------------|
| 2 cases (30 mg) | (1) +16 to -30 in 70 minutes      |
|                 | (2) +20 to -10 in 53 minutes      |
| 2 cases (45 mg) | (1) +55 to +82 in 80 minutes      |
|                 | (2) pH 1.47 to 8.42 in 68 minutes |

It will be seen that the results by mouth were not regular, though with one exception the trend

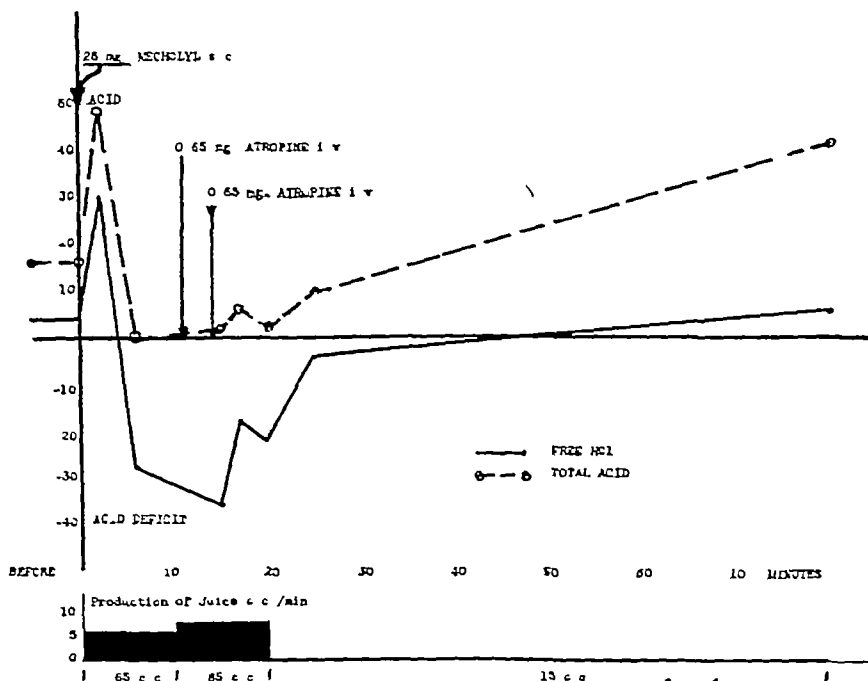


CHART 3  
Effect of Mecholyl and Atropin on Gastric Juice.

ent, in some cases even in the dilution of 1-16 and this usually reached a maximum in 1 to 1½ hours

#### PROSTIGMIN

This was given in 7 cases, the following doses being administered in 1 case, 2 cc of 1-2000 solution (1 mg) subcutaneously, in 2 cases, 1 cc (0.5 mg) subcutaneously, in 2 cases, 30 mg by mouth, in 2 cases 45 mg by mouth. The results were as follows

**Quantity** It was difficult to determine whether the volume became increased or diminished because the time of the reaction was difficult to note. In general, no decrease in volume occurred, and there was possibly a slight increase

**Free Hydrochloric Acid** In the 3 cases

was toward alkalinity. Subcutaneously, the results were always in the same direction, namely, an alkaline juice containing mucin. In several cases, which we did not titrate, the effects were unmistakably toward the alkaline direction

#### ATROPIN

The effects of atropin on gastric juice are well known. In our cases the gastric juice became markedly decreased in amount, in some instances disappearing entirely. The acidity did not essentially change. Our main use of atropin was to check it against mecholyl and benzedrine sulfate

#### COMBINATIONS

**Atropin Followed by Mecholyl** Since atropin is a parasympathetic paralyzer it would be

assumed in advance that if given before the administration of mecholyl, the mecholyl effects would not appear. This was in part confirmed by our experiments and in part contradicted. The amount of secretion was not increased by mecholyl administration after atropin, the diminution continued. However, the free hydrochloric acid, which was +64 units at the beginning of the experiment and which remained at about that level after 26 mg atropin had been administered, dropped to +25 units after the administration of mecholyl and remained at this level for 1 hour and 55 minutes. It should be noted that a tremendous amount of atropin was given. In other words, while the secretion was not increased by mecholyl, the mecholyl effect on the acidity occurred though in much reduced measure.

sulfate would enhance the benzedrine reaction, since by removing the parasympathetic brake or effect of acetylcholine, the sympathetic stimulation would be increased. This occurred in our experiments. A typical chart is shown (chart 4). The increase in acidity reached a higher level than in any other of the experiments, and the juice continued at this heightened level of acidity for a longer period of time. The amount of secretion remained fairly consistent throughout the experiment. Thus, in the 40 minutes following the administration of benzedrine, the chart shows by the thickened base line that the secretion per minute scarcely changed at all and certainly was not diminished by the atropin. This is definitely in harmony with our results on blood pressure. In large doses, benzedrine sulfate raised the blood pres-

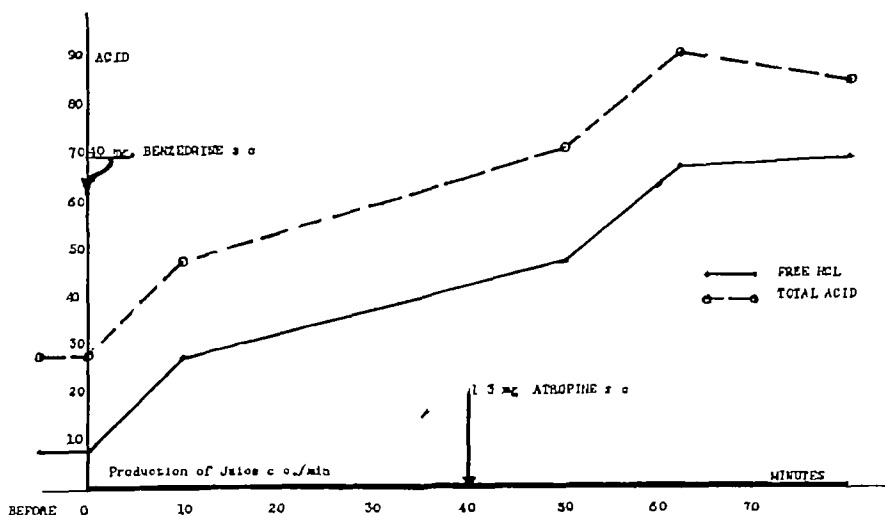


CHART 4  
Effect of Benzedrine and Atropin on Gastric Juice

*Mecholyl Followed by Atropin* The results of the administration of mecholyl followed by atropin are graphically recorded in chart 3. It may be seen from this chart that when the characteristic effects of mecholyl were produced—achlorhydria with acid deficit, increase in volume per minute—atropin was given in two divided doses of 65 mg each. Clinically, this was followed by a striking and prompt disappearance of all external effects, as noted in our previous experiments. In the gastric juice, the acid deficit became lessened, so that within 10 minutes it had returned to almost 0 (—5). This was comparable to the previous experiments with mecholyl alone. The total acidity, reduced to 0 with mecholyl, gradually rose to normal. The amount of juice produced became strikingly reduced so that in 1 hour only 15 cc were collected.

*Benzedrine Sulfate Followed by Atropin* It would be expected, theoretically, that the administration of atropin following benzedrine

sure. If atropin is added to the benzedrine, the rise becomes very marked.

*Benzedrine Sulfate Followed by Mecholyl* In previous experiments it was noted<sup>o</sup> that when benzedrine effects were obtained, the injection of mecholyl completely abolished them and then mecholyl effects followed as if no benzedrine had been given. This was true in the case of blood pressure and heart rate. It was equally true of the gastric juice, as is strikingly shown in chart 5. This chart shows that after benzedrine the rise of the free hydrochloric acid was from 4 units to 25 and that the amount of secretion per minute was about 2 cc. When the mecholyl was administered, there was an immediate drop in the acidity to —50, with a final deficit of 58 units. The volume increased to 6 cc per minute. The hydrogen ion concentration which had increased to pH 1.8 at the height of the benzedrine reaction decreased to pH 9.0 at the height of the mecholyl reaction. Mucin appeared in large

quantities during the mecholyl phase and disappeared at the end of 40 minutes, when the gastric juice became somewhat more acid than it had been during the height of the benzedrine

effect of prostigmin given subcutaneously caused a slight rise in the pH, that is, a slight diminution of acidity, and, in 16 minutes, 10 mg mecholyl were given. This dose by itself in

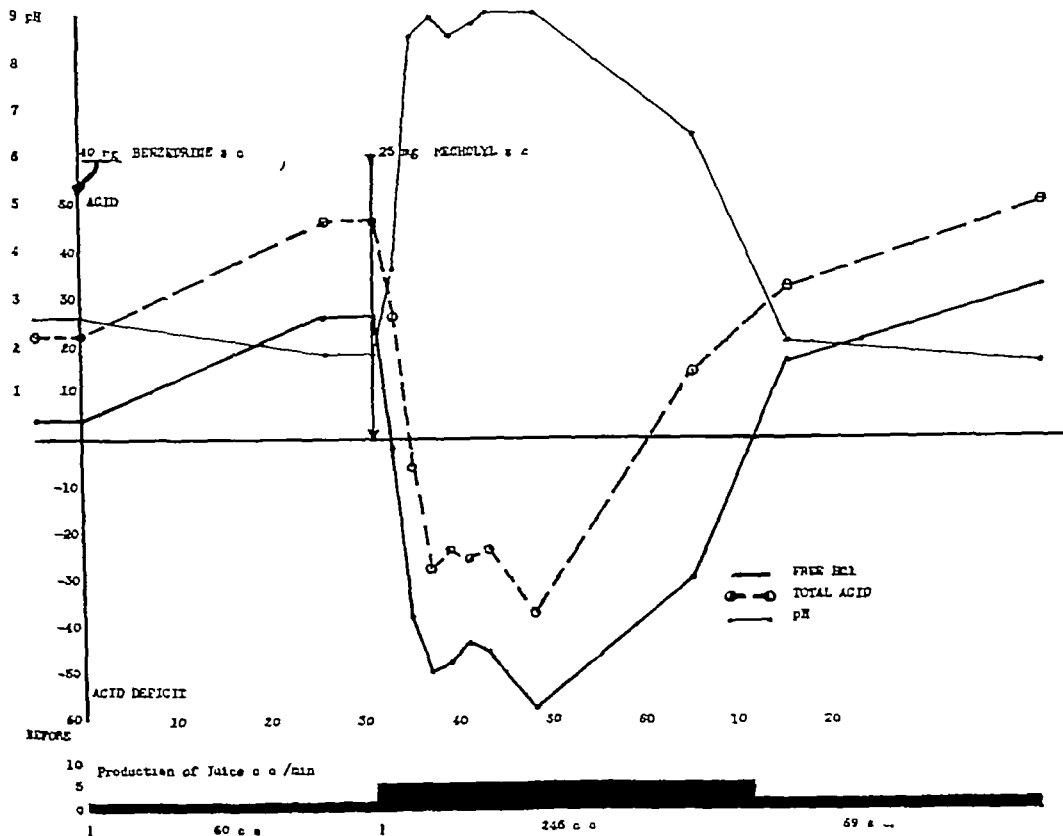


CHART 5  
Effect of Benzedrine and Mecholyl on Gastric Juice

reaction. In this experiment it will be seen that the parasympathetic stimulation predominated over the sympathetic stimulation or, to put it chemically, the mecholyl effect was greater than the benzedrine effect. This has been uniform in our experimentation.

*Prostigmin (or Physostigmin) Followed by Mecholyl.* Theoretically it would be expected that the use of both prostigmin and mecholyl would result in an increased general parasympathetic effect, since prostigmin is one of the group of drugs that is supposed to inhibit the esterases, which, in their turn, destroy or inhibit the effects of the bodily acetylcholine or the acetylcholine group of drugs. This theoretical expectation was completely confirmed in all of our experiments, some of which will be recorded in a later publication on sweating and other physiologic processes. Chart 6 shows graphically this relationship. The pH started at 2.1, a typical acid gastric juice, and then dropped spontaneously to just under 2. One

the same patient was unable to change the pH in any great measure. In this experiment the

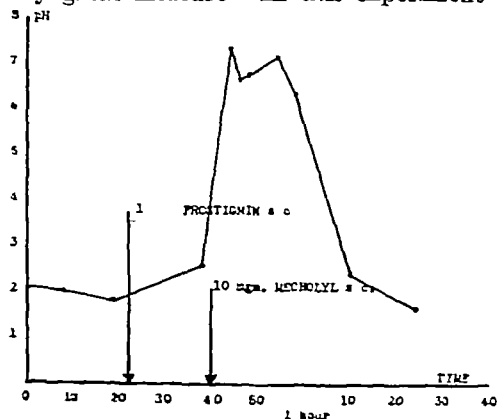


CHART 6  
PH of Gastric Juice Following Administration of Prostigmin and Mecholyl

10 mg of mecholyl changed the pH from 2.6 to 7.5, at which level the gastric juice remained for about 15 minutes and then dropped within

the next 30 minutes to its original acidity. In other words, prostigmin acts as a synergic factor for mecholyl, thus enabling small doses of mecholyl to produce a marked effect in changing the gastric juices from acid to alkaline. This relation we believe to be of importance in the iontophoresis treatment of ulcers, arthritis and tachycardia—in other words, those clinical uses to which mecholyl has already been put. We may state at this point that physostigmin has fundamentally the same effect as prostigmin in relation to the acidity of the gastric juices and the amount of gastric content. By itself it produces a slight change in the direction of alkalinity, that is, it will reduce the acidity but it will not produce an alkaline secretion or mucin. If, however, given prior to the administration of mecholyl, a small dose of mecholyl will produce drastic changes in the gastric juices of the nature here described as the typical mecholyl effect.

#### LITERATURE

There is no literature so far as we know that concerns gastric secretion following the use of benzedrine, physostigmin, prostigmin or the combinations that we have discussed. We may state that our work was undertaken without knowledge of any previous experimental work on man.

Mecholyl has been studied in relation to its effects on the gastric juices by Ferguson and Smith<sup>7</sup> in respect to the gastric acidity of monkeys. Their technique involved the use of a test meal. They found that the free gastric acidity was completely abolished if a sufficient dose of mecholyl was given, and their results with atropin run parallel with ours. They found that the total acid was parallel with the free acid curve. The total chlorides were unaffected. The mucous secretions were definitely increased, largely in the saliva. However, in human experimentation, Abbott<sup>8</sup> reported results that are opposite to ours. His conclusion was that mecholyl increased the acidity, at the same time increasing gastrointestinal tone and motility. In criticism of his results it may be stated that he probably used too small a dose. He gave 5 to 10 mg subcutaneously and 200 to 300 mg by mouth. Oral administration brings practically no results, as we learned by repeated experiments. Moreover, the technique of his experimentation was erroneous in that the first sample that he took after the administration of the drug was obtained in 5 to 20 minutes. We have experiments on record in which the mecholyl effect took place and disappeared completely within the same period of time especially with small doses such as he administered. In other words he did not produce the full mecholyl effect in his experiments and his

technique of observation missed the changes that took place.

Since 1926 the synergic relation of physostigmin and acetylcholine derivatives has been known. The literature, while scanty, is authoritative and starts with the work of Loewi<sup>9, 10</sup> himself. It was he who first discovered the production of acetylcholine by the parasympathetic nervous system and who later showed that the esterases have a destructive enzymic effect on this chemical and that physostigmin inhibits the destructive power of the esterases. Hunt,<sup>11</sup> Fuhner,<sup>12</sup> and Fried and Uldert<sup>13</sup> have confirmed this general relation.

#### DISCUSSION

From the clinical standpoint, many possibilities suggest themselves, for example, "functional" or "false" achlorhydria may be indicative of a vagal or parasympathetic state, more exactly an overproduction of acetylcholine, and so may an excessive mucin concentration in the gastric juice. Hyperchlorhydria may be evidence of sympathetic overstimulation or its chemical equivalent. The lack of mucin in the gastric juice of certain individuals may also point in this direction. To speculate further, the hyperchlorhydria of peptic ulcer and the associated diminution in mucin content, as demonstrated by Anderson and Fogelson,<sup>14</sup> may be based upon an increased activity of the sympathetic nervous system.

Therapeutically, measures for raising the mucin content of the gastric juice and lowering the acidity have been found to be of distinct value in peptic ulcer. Mucin has been utilized in this respect with some success. This might be achieved without the feeding of mucin by the use of various parasympathetic stimulants, such as mecholyl, physostigmin or prostigmin. Functional achlorhydria and gastric symptoms associated with a possible "vagal" state might be benefited by the sympathomimetic drug, benzedrine sulfate. The diagnostic and therapeutic implications of exact knowledge of the effects of these drugs on the gastric juice are seen to be great and should repay further study and clinical investigation.

#### SUMMARY OF RESULTS

The effects of certain drugs upon the gastric secretions are here presented. These effects may be summarized as follows:

(1) Mecholyl remarkably stimulates the production of mucin, regularly increases gastric juice secretion and inhibits the production of hydrochloric acid and pepsinogen, thus producing a copious alkaline gastric juice.

(2) Benzedrine sulfate either slightly diminishes or does not affect the amount of gastric juice, but definitely and regularly increases

the free hydrochloric and the pepsinogenic activity

It is noteworthy that mechohlol also increases gastrointestinal tonus and benzedrine sulfate relaxes or diminishes spasm

(3) Atropin regularly diminishes the secretion of gastric juice without in any noticeable way affecting the chemical relationships

(4) Prostigmin and physostigmin produce or tend to produce an alkaline gastric juice of the same general nature as the mechohlol effect but in lesser degree and without noticeable general bodily effects

(5) Atropin given in advance of mechohlol prevents its effects in so far as increase in rate of secretion is concerned and diminishes its effects in so far as alkalinity is concerned. It has the same general relation to the mechohlol effect given after this chemical in so far as quantity is concerned but seems to have no definite effect on the alkalinity produced by mechohlol

(6) Mecholol completely overshadows the benzedrine sulfate effect, but after its effect has worn off the benzedrine sulfate effect becomes again manifested

(7) Atropin administered after benzedrine sulfate enhances its general effects on the gastric juice

(8) Prostigmin and physostigmin act synergistically with mechohlol on the gastric juices thus bringing it about that a small dose of mechohlol will produce a complete mechohlol effect if either of these drugs is administered previously or concurrently

(9) Iontophoresis of mechohlol produces definite mechohlol effects on the gastric juice

It appears to us that these experiments es-

pecially those in which alkalinity is produced should receive consideration on the part of clinicians for the treatment of gastric ulcer and hyperacidity. We believe that the iontophoresis method if carefully worked out, may furnish a valuable way of administering these drugs so that a moderate alkalinity, with mucus is maintained over a considerable period of time

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## FRACTURES IN THE NEWBORN\*

### A Plea For Adequate Treatment

BY AUGUSTUS THORNDIKE JR M D † AND F RICHARD PIERCE M D ‡

THE problem of adequate treatment of birth fractures commands the interest of the obstetrician, pediatrician, surgeon, and orthopedist. The old teaching that mere fixation is the only treatment required to produce good results in this class of fractures is no longer considered satisfactory. The general improvement and interest in fracture therapy today largely stimulated by the Fracture Committee of the American College of Surgeons demand that even these specialized fractures must not be neglected.

In a review of the last six thousand fractures at the Children's Hospital Boston it was a re-

lation to find cases of birth fractures that had come to the hospital at twelve to eighteen months of age because of unilateral bowlegs. Needless to say, inadequate treatment of birth fracture is one explanation of such a condition. The importance of proper treatment of these fractures must not be overlooked.

We feel that in the great majority of cases the attending physician cannot be blamed for a fracture occurring during the course of delivery. We do not agree with Newman and Levy<sup>1</sup> that poor technique and injudicious use of instruments are the chief causes of birth fractures but believe that they are accidents and that as such are many times unavoidable.

Just as remarkable in the accidents of labor are those cases of precipitate labor which are born without injury. Von Winkler<sup>2</sup> reports two hun-

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dred and sixteen cases of precipitate labor without a single instance of serious injury Strumpf<sup>3</sup> quotes Sir William Osler as follows "The child was born in the toilet of a fast-moving train, fell to the tracks and showed only slight contusions" With such reports as these, one might wonder why the incidence of birth fractures was not greater

Reported statistics on the incidence of birth

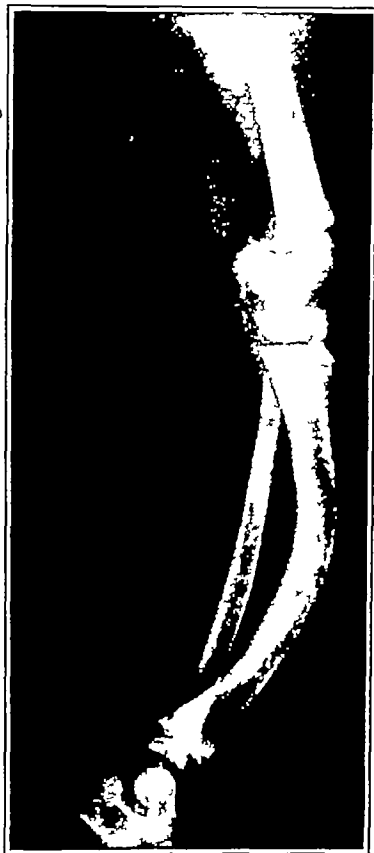


ILLUSTRATION NO 1

X Ray No 42259—Old Fracture of Tibia

Unilateral bowing from untreated birth fracture of the tibia.

fractures vary from 39 cases in 33,000 deliveries reported by Truesdell<sup>4</sup> to 36 per cent—77 per cent femur fractures in breech deliveries by Ehrenfest<sup>5</sup> It is generally agreed as Gibberd<sup>6</sup> has pointed out, however, that there is a higher incidence in all types of birth injuries in breech presentation One factor is self-evident in reviewing the literature and that is the paucity of reports and studies of larger series of cases

In this series of 115 consecutive cases of birth fracture reviewed at the Children's Hospital, Boston, 53 fractures of the clavicle, 38 of the humerus, 20 of the femur, 4 of the tibia including 3 with fibula, have been studied No fracture of the radius and ulna was found in this collection of cases, and cases of fracture of the skull or spine have not been included Furthermore, 20 per cent of the fractured clavicle

cases, 92 per cent of fractured humerus cases, 72 per cent of fractured femur cases, and 50 per cent of fractured tibia cases required unusual obstetric maneuvers for the delivery of

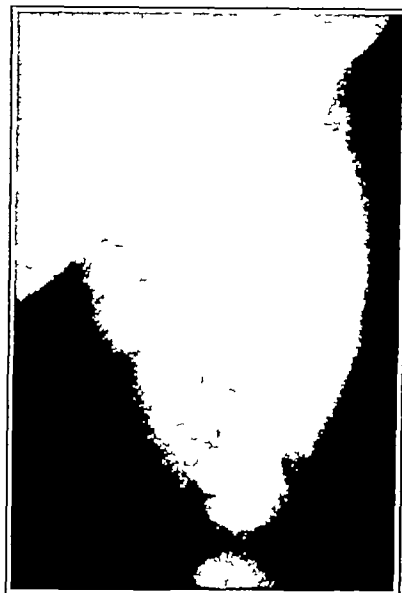


ILLUSTRATION NO 2

X Ray No 162825

Seven months of age Unrecognized birth fracture Lateral bowing with shortening

a live baby With the revelation of these figures, blame for such accidents cannot justly be placed solely on the medical man in attendance at the time of delivery

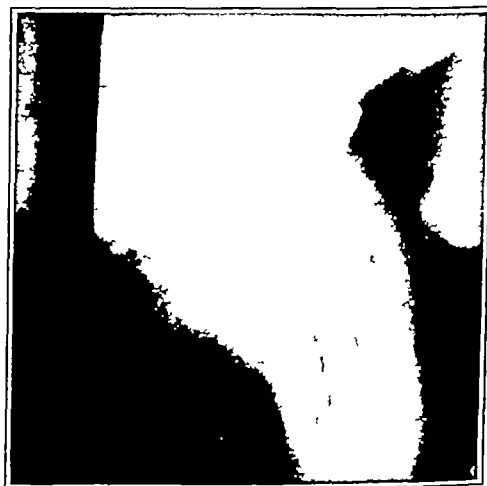


ILLUSTRATION NO 3

Case No 129415—Fractured Femur

Fractured left femur on entry Displacement and overriding present Ten days of age on entry Callus prevented proper realignment

However, 40 fractures, or 34 per cent, of the entire group were not recognized at the time of their occurrence, a situation for which the attending physician or obstetrician may be con-



## BIRTH FRACTURES

	Name and Birth Wt	Hosp No	Age	Sex	Labor and Type of Delivery	Location and Type	Time of Recognition	First X Rays	
1	J M 6	115576	1 day	M	Cesarean	Rt femur oblique mid and upper 1/3 posterior displaced lower fragment marked overriding	Birth	1 day	Leg strapped unsatisfactory wire splint - good Put on with overhang
2	D R 78	109058	14 mos	F	Breech	Marked ant. bowling due to old healed fracture	2 wks By District Nurse	2 wks by attend phys	None
3	M A 9+	113042	1 yr	F	Breech Difficult	1 cm from upper end of lt femur Sharp lat angulation	1 yr	1 yr	None
4	M A 86	105266	2 wks	F	Primip Breech	Transverse midshaft Post displacement of lower fragment overriding 1/2 cm	At birth	12 hrs	Post wire splint coaptation splint
5	M C 83/4	129115	1 wk	F	Breech Leg snapped in attempting to twist body	Transverse mid and upper 1/3 Ant displacement of upper 1/3 with overriding	At birth	1 wk	Overhead traction
6	B H 7	150443	2 days	F	Footling trauma to rt leg	Chip fractures off the lower margins of both femora	1 day	2 days	Not admitted
7	B F	167497	2 days	F	26 hr labor Breech delivery difficult	Rt oblique mid 1/3 with anterior angulation	Birth	2 days (34713)	Traction with (overhead) 2
8	M A W 10	145297	1 mo	F	Difficult version breech delivery	Upper of lt femur	1 month not rec by attending physician	About 1 wk out side 1 mo at this Hospital	None
9	L C 511	181391	2 wks	F	Forceps delivery	Midshaft right	Birth at Maternity Hospital	Birth	Bandaged lt
10	H K 67	181061	13 days	M	Cesarean Difficult	Oblique midshaft	Birth	10 days	Wire splint
11	H K F 9	117521	1/2 mos	M	Cesarean section difficult	Fracture of neck of lt femur	1 1/2 mos	1 mo outside	None
12	W P 63	172111	16 mos	M	Normal	LA with lateral bowling	Birth (36963)	16 mos C H	Plaster 1 wk Bandage 2 w

14	D A 9	169673	9 days	M	Difficult Breech	Midshaft left	7 days X ray at Maternity Hosp	9 days at C H (35804)	Splint with an aid holding on to hold I
14	P A 6 1/2	168490	11 mos	F	Normal	Old midshaft healed	At birth	16 mos at C H	None
15	M M 8	172150	3 wks	F	Instrumental breech	Mid and upper 1/3 rt. backward displacement (on entry to C H)	Birth by attending physician	By attend phys 3 wks at C H (36839)	Bandage applica 1 C H with
16	S B 9 2	151546	1 yrs	M	Easy	Upper end lt Antero Lat Bowing Lt. tro chanter and bone Neal ton's line	4 yrs Came because of stiff hip, stiff knee fault	1 yrs	None
17	D G (Less than 2 mos premature)	154077	16 mos	M	Normal	Mid and upper 1/3 Marked lat bowing	16 mos	16 mos	None
18	E B 6	162625	9 mos	M	Easy Vertex	Shortened end lt. femur lt mid and upper 1/3 with lat angulation	9 mos	7 mos	None
19	W F 6 3	172411	16 mos	M	—	Rt midshaft with bow lug laterally	Birth	Birth	Plaster s aged 2 w
20	R G 10 8	131849	3 mos	M	Difficult Breech	Low lt femur with post. angulation Neck lt femur with coxa vara Humerus mid 1/3	3 mos, humerus diagnosed at birth	3 mos	Seen by a no treatment
BIRTH FRACT									
1	D C 8 10	137913	8 mos	M	Easy Vertex	Lt tibia mid 1/3 Lt fibula lower end	Symptoms noted 4 mos	8 mos (23401)	Immobilized in union
2	W A M 9	163822	14 mos	F	Difficult Breech	Rt tibia and fibula	Birth	? 1 wk. at C H at 14 mos	Not known healed" v charged fr
3	D D 3	184503	1 yr 3 mos	M	—	Rt tibia and fibula	Birth	13 mos	None
4	A. M S	146942	3 wks	F	Difficult Breech	Lt tibia midshaft Moderate overriding posterior angulation	1 mo	1 mo	None

sidered responsible. Unrecognized and untreated fractures in this age group heal by the process of natural repair, but always with more deformity, sometimes permanent, than when adequate treatment is promptly applied. Repair of bone in this age group is so rapid that after 5 days of age it is impossible to reduce these fractures manually. The necessity of early diagnosis for effective treatment is of the utmost importance.

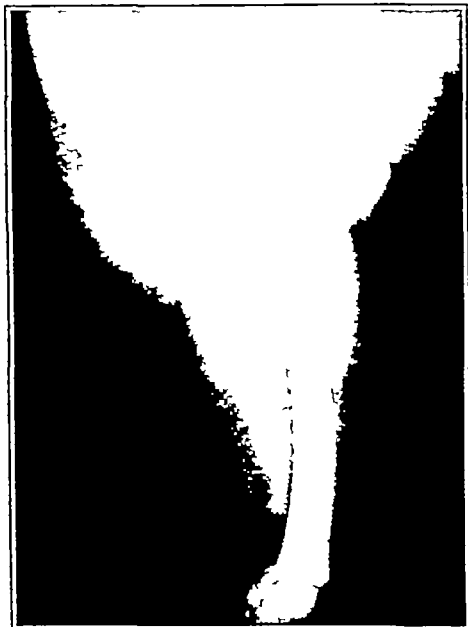


ILLUSTRATION NO. 4

Case No. 129415—Healed Fractured Femur

Lateral view 10½ months after fracture. No shortening. Natural repair aided by fixation in overhead traction.

Adequate treatment of fractures in the newborn consists in (1) early diagnosis, (2) prompt realignment of the fragments, and (3) proper fixation until union has taken place. The early recognition of these fractures is essential if anatomic alignment is the aim of treatment. Many argue that nature repairs these fractures even if untreated (Pritchard and Smith<sup>8</sup>) but, excepting cases of clavicle fracture, we report that in 27 cases in which the treatment was considered inadequate 16, or 60 per cent, resulted in some deformity of bone (See illustrations 1 and 2). The reduction of these fractures does not involve the complicated manipulative procedures (no spasm) required in older children and in adults, but merely an accurate realignment of the fragments. When this is properly accomplished, useful and appropriate methods of fixation are at our disposal. A description of these types of fixation is presented in the accompanying table and illustrations.

These recommended methods for fixation have

produced good results. Although many methods have been described in the literature,<sup>7, 9, 10, 11</sup> these presented here are preferred because of their simplicity, uniformity, and ease of appli-

TABLE 1

Bone	Type of Fixation	Period of Fixation
Clavicle	Figure of 8 with skein yarn	3-4 weeks
Humerus	Axillary pad of wadding, coaptation splint, internal angular splint or moulded plaster Swathes	4-5 weeks
Femur	Overhead skin traction of both legs on Bradford Frame with 23 lbs weight.	4-5 weeks
Tibia, or Tibia and Fibula	Plaster, toes to groin	4-5 weeks

cation. A brief summary of results obtained in this series of 115 cases follows and confirms our belief in the adequacy of these methods.



ILLUSTRATION NO. 4a.

Case No. 129415—Healed Fractured Femur

Ten and one-half months after fracture. No shortening. A. P. view of case shown in Illus. 3 and 4.

Many cases of clavicle fracture heal well even though untreated and are frequently recorded when the parent discovers a callus enlargement after union has taken place. However, early diagnosis and application of a skein of yarn

in a figure of 8 are recommended (fig 1). In 20 cases of humerus fracture treated with coaptation splint, internal angular splint, or moulded plaster, axillary pad and swathe, results were good, whereas in 50 per cent of those treated by other methods the results were unsatisfactory. In every instance of femur frac-

ture in 75 per cent at the time of admission to the hospital. Another case resulted in non-union after a bone graft.

An important adjunct to the method of fixation of these fractures in the newborn is the hygiene and care of the baby's skin. Adequate padding and skin hygiene is essential to avoid



FIGURE 1

Figure of 8 principle using a skein of white yarn for fracture of clavicle

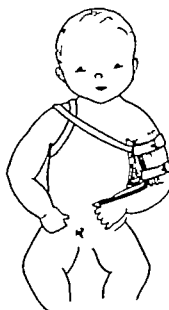
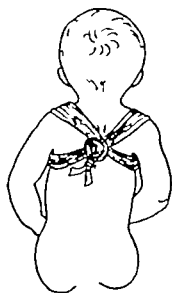


FIGURE 2

Axillary pad of sheet wadding, coaptation splints and internal angular splint or moulded plaster with swathe for fracture of the humerus

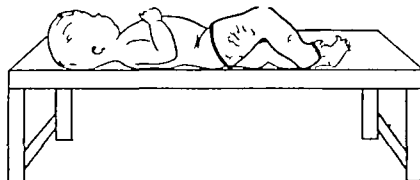


FIGURE 3

Plaster of Paris toes to groin with knee flexed for fracture of the tibia and fibula

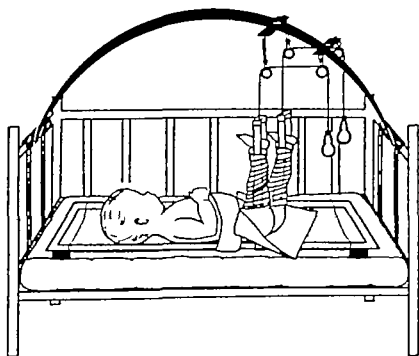


FIGURE 4

Skin traction with adhesive and 2 or 3 lbs of weight with vertical pull on rainbow frame for hospital treatment of fracture of the femur. Note both legs

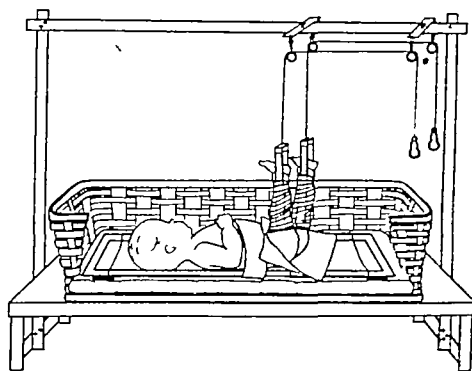


FIGURE 5

Same as fig 4 only using laundry basket and homemade wooden overhead frame.

ture treated with overhead skin traction on a Bradford frame (figs 4 and 5) the end-result was satisfactory, whereas in 100 per cent of those treated with adhesive strapping of the leg to the abdomen, unsatisfactory results were obtained necessitating a change in the treatment after a short trial. In only one case in this group was a fracture of the lower leg reported early enough to have appropriate reduction and fixation applied, deformity being already pres-

ent in 75 per cent at the time of admission to the hospital. Another case resulted in non-union after a bone graft. The appearance of pressure sores, and other complications. Especially is it of the utmost importance in the fixation of fractures of the femur to allow for careful hygiene of the skin of the buttocks. The authors believe that fixation of these fractures by overhead adhesive traction is the one method most adaptable for convenient diaper hygiene.

We cannot subscribe to the old teaching that birth fractures always heal spontaneously and

satisfactorily regardless of any treatment instituted. As recently as 1934 Pitchard and Smith<sup>8</sup> propounded this thesis before the Royal Society of Medicine and were severely criticized in the discussion of their paper. It is the aim of our paper to emphasize that improved meth-



ILLUSTRATION NO. 5

X Ray No. 3744—Cleidocranial Dysostosis

Six months of age. Thought to have been an ununited birth fracture of the clavicle.



ILLUSTRATION NO. 6

X Ray No. 27962—Dysostosis of Tibia

This may have two fragments (distal as well as proximal)

ods of treatment of birth fractures certainly are yielding better results. For early diagnosis, prompt and appropriate fixation in good alignment are essential to the attainment of good results.

The correct differential diagnosis of birth fractures is also important. Apparently cases of cleidocranial dysostosis have been wrongly considered as birth fractures. Other cases of

tibial dysostosis may be found which have been classified incorrectly as fractures in the newborn. Fitchet<sup>12</sup> has described most completely the anomaly of cleidocranial dysostosis, which is actually an intrauterine developmental anomaly of unique nature. The author found one old case indexed in the files of the Children's Hospital as intrauterine fracture of the leg which actually was a dysostosis of the tibia. Cases of osteogenesis imperfecta and of fragilitas ossium have also at times been classified as birth fractures particularly if the first fracture occurred at the time of delivery. This also is a develop-



ILLUSTRATION NO. 7

X Ray No. 34322—Osteogenesis Imperfecta

mental anomaly of utterly dissimilar nature. Since the pathology originates during intrauterine development, these three conditions should never be classified as true fractures in the newborn.

Excluding these intrauterine pathologic conditions, true intrauterine fracture may occur rarely, as described by Smith<sup>13</sup>. In 35 cases of 43 collected by him the pregnant mother had experienced severe trauma to the abdomen (gunshot, sickle, pitchfork heavy falls and body blows). In our series however not one proved instance of true intrauterine fracture was discovered.

It is perhaps preferable to record the complications of birth fracture in table 2.

An important consideration in attempting to reduce the incidence of birth fractures is the control of body weight and size of the fetus. From the 90 histories in which the birth weight was known, reviewed in this series a table has been made of the average birth weights in each bone fracture (table 3).

in a figure of 8 are recommended (fig 1). In 20 cases of humerus fracture treated with coaptation splint, internal angular splint, or moulded plaster, axillary pad and swathe, results were good, whereas in 50 per cent of those treated by other methods the results were unsatisfactory. In every instance of femur frac-

ture in 75 per cent at the time of admission to the hospital. Another case resulted in non union after a bone graft.

An important adjunct to the method of fixation of these fractures in the newborn is the hygiene and care of the baby's skin. Adequate padding and skin hygiene is essential to avoid



FIGURE 1

Figure of 8 principle using a skein of white yarn for fracture of clavicle

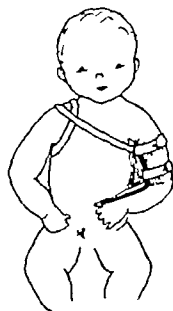
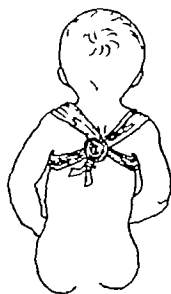


FIGURE -

Axillary pad of sheet wadding coaptation splints and internal angular splint or moulded plaster with swathe for fracture of the humerus

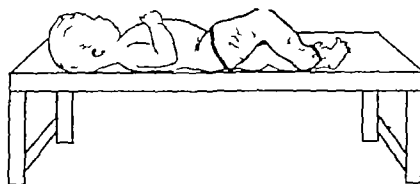


FIGURE 2

Plaster of Paris toes to groin with knee flexed for fracture of the tibia and fibula

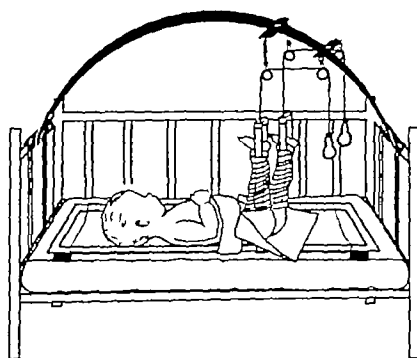


FIGURE 4

Skin traction with adhesive and 2 or 3 lbs of weight with vertical pull on rain bow frame for hospital treatment of fracture of the femur. Note both legs

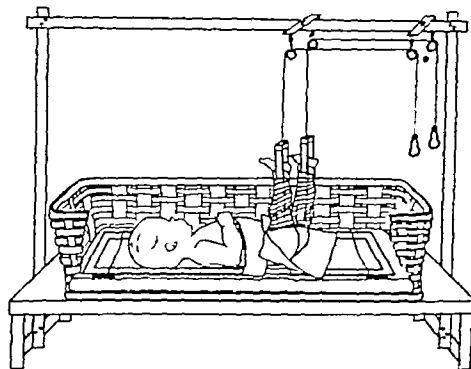


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Same as fig 4 only using laundry basket and homemade wooden overhead frame

ture treated with overhead skin traction on a Bradford frame (figs 4 and 5) the end result was satisfactory, whereas in 100 per cent of those treated with adhesive strapping of the leg to the abdomen, unsatisfactory results were obtained necessitating a change in the treatment after a short trial. In only one case in this group was a fracture of the lower leg reported early enough to have appropriate reduction and fixation applied, deformity being already pres-

ent in 75 per cent at the time of admission to the hospital. Another case resulted in non union after a bone graft. An important adjunct to the method of fixation of these fractures in the newborn is the hygiene and care of the baby's skin. Adequate padding and skin hygiene is essential to avoid the appearance of pressure sores, and other complications. Especially is it of the utmost importance in the fixation of fractures of the femur to allow for careful hygiene of the skin of the buttocks. The authors believe that fixation of these fractures by overhead adhesive traction is the one method most adaptable for convenient diaper hygiene.

We cannot subscribe to the old teaching that birth fractures always heal spontaneously and

RECENT ADVANCES IN THE TREATMENT OF RECTAL  
DISEASES BY INJECTION METHODS IN  
AMBULATORY PATIENTS\*

## II Pruritus Ani

BY NAAMAN STEINBERG, M D

**P**RRURITUS ani has probably been common to man throughout the ages. As early as 1698 it attracted medical comment and was considered a distinct entity. In 1694 Josephus Langonius<sup>1</sup> mentioned and described a severe perianal itch which he called a "pruritus". Thinking he observed a certain periodicity of the disease, he sought to explain it on the basis of the then current astrologic systems as being related to the solstice of the sun. From then on, it was mentioned only occasionally in medical writings and textbooks until the beginning of the twentieth century. In recent years an increasing interest in the subject has led to numerous studies, and a number of valuable therapeutic measures have been proposed.

Many are of the opinion that the condition is merely a symptom, others consider it a distinct clinical entity. Various classifications have been proposed. Gant,<sup>2</sup> for example, divides the etiology into several groups: 1 Constitutional diseases, such as diabetes, gout or hepatic disease. 2 Local perianal diseases, such as hemorrhoids, fissure, fistula, cryptitis or proctitis. 3 Parasitic, skin and fungus diseases, such as scabies, pediculi, eczema or epidermophytosis. 4 Reflex disorders caused by disease of the pelvic organs. 5 Idiopathic or "pruritus essentialis", as described by Tuttle. Many included in the last category would naturally be listed in one of the first four groups, if more concerning the nature of the disease were known.

Montague<sup>3</sup> presents two main groups. A The direct type, where there is definite evidence of disease in the region of discomfort. B The indirect type, where the itching is probably referred from some other region such as the stomach, the gallbladder or the appendix. His explanation of itching is analogous to that for referred pain from disease of a viscus.

Pruritus ani does not require definition. The itching is frequently exaggerated at night resulting in insomnia and impairment of health. In addition to itching in the immediate anal region there is often extension to the scrotum and the perineum. The skin usually presents a whitish appearance and may be smooth and glistening. In some it is thrown into many deep folds radiating from the anal orifice. When the

condition has been present for some time there is generally definite induration. Abrasions and excoriations may be present when there has been scratching and the skin is often red and denuded.

What are we to do for those patients in whom the process appears to be entirely local? The course of treatment, when the local itching is due to some general cause, such as diabetes is obvious. But, even here, when the primary factor has been taken care of, the local itching may still persist. The same may be true when pruritus is related to such proximal conditions as hemorrhoids and tabs. The removal of the latter may not result in a cure, as is true with pruritus associated with a skin lesion elsewhere. Soon after itching occurs changes in the skin result probably because of the trauma of scratching, these factors keep the process going and a vicious circle is established.

Before the twentieth century, the treatment consisted in applying various lotions, ointments and powders locally. Thereafter the nervous innervation was attacked by surgery and by the subcutaneous injection of various solutions. Sir Charles Ball<sup>4</sup> in 1905 was the first to attempt a surgical method. Later, others modified the technique. The superficial nerve filaments in the affected area were severed by subcutaneous incision. Relief was accomplished. Regeneration, however, occurred in most instances with recurrence of itching in from 3 to 6 months.

Murray<sup>5</sup> attempted to show that pruritus was an infection caused by *Streptococcus fecalis* and he claimed good results by treating the patient with autogenous vaccines. Others could not confirm his claims.

Rolfe<sup>6</sup> used ionization, solutions of zinc or iodine being applied by special anal electrodes to the affected regions. Repeated treatments were necessary. The results were dubious and the relief of short duration at most.

Ultraviolet ray therapy and diathermy have also been used with little relief.

Kolde<sup>7</sup> advocated x-ray therapy and, surprisingly, claimed good results in women, but poor results in men. Pruitt<sup>8</sup> and Lockhart-Mumery<sup>9</sup> both report "15 per cent cures" by this method. A "15 per cent cure" should not be taken seriously unless properly controlled. If x-ray is to be used, care should be exercised in selecting the radiologist for improper administration results in serious complications. In

From the Rectal Clinic of the Beth Israel Hospital, Boston, Massachusetts.

Read before the Clinical and Surgical Association of Massachusetts, April 2, 1936.

\*Steinberg, Naaman—Proctologist, Beth Israel Hospital, Boston, Mass. For record and address of author see "This Week's Issue," page 1043.

It is evident that, in every bone fractured, the average weight was above the normal. Since the fetal weight, according to Abels and others<sup>14 15 16</sup> may be influenced by regulation of the maternal diet, it would appear from ta-

from 98 cases in which the type of delivery was recorded, illustrates clearly that the majority of these cases of birth fracture required manipulative procedures to produce a live baby

TABLE 2

No of Cases	Birth Fracture	Complications from Birth Trauma and Treatment	
53	Clavicle	Brachial palsy	7 (one temp)
		Torticollis—sternomastoid rup	4
		Facial palsy	2
		Fractured humerus	1
38	Humerus	Brachial palsy	6
		Musculo-spiral palsy	11 (all temp)
		Fractured skull with transection of cord	1
		Fractured femur	1
		Fractured clavicle	1
20	Femur	Nonunion—(after operative intervention to correct deformity)	1
		Fractured humerus	1
3	Tibia and Fibula	Fracture of clavicle	1
1	Tibia	Nonunion—(after operative bone graft for nonunion)	1

ble 3 that more careful attention might be paid to this item during prenatal care. So controversial, however, is this subject, that space does not permit its discussion.

TABLE 3

Bone	Wt Recorded in	Average
Clavicle	44 cases	9 lbs
Humerus	24 cases	8 lbs, 14 ozs
Femur	20 cases	8 lbs
Tibia and Fibula	2 cases	8 lbs, 13 ozs

TABLE 4

Bone	Type of Delivery Recorded in	Percentage of Abnorm Deliveries
Clavicle	44 cases	67%
Humerus	31 cases	75%
Femur	20 cases	85%
Tibia and Fibula	3 cases	67%

A second important factor in reducing the incidence of birth fractures is the type of presentation at the time of labor. Table 4, made

## CONCLUSIONS

- 1 The incidence of birth fractures to all fractures as seen in a review of 6,000 cases at the Children's Hospital, Boston, reveals 113 6000 or approximately 1 60
- 2 Birth fractures are, in the large majority of cases, accidents occurring in difficult obstetric manipulations
- 3 Birth fractures in this series occurred in most cases in large babies
- 4 Not one instance of true intrauterine fracture was found in this review. The disease entities of osteogenesis imperfecta, fragilitas ossium and the dysostoses should not be considered as included in true birth fractures
- 5 The pleas for more adequate treatment in fractures of the newborn consist in (1) early diagnosis, (2) early manipulative alignment of the fragments involved, and (3) proper fixation
- 6 An outline for methods of fixation with illustrations is presented.

NOTE The authors wish to express their appreciation of the permission granted them by the Orthopedic Service of including in this series a few of its cases of unilateral bowleg.

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injection is given 2 days later in the opposite posterior quadrant and at 2 day intervals the two anterior quadrants are treated in a like manner. *Great care should be taken not to inject the solution too superficially or intradermally as sloughing will invariably follow.* The external sphincter muscle should not be injected because if more than one quadrant of the muscle has been injected, the anal canal may become patulous and temporary loss of control take place.

After the injections have been completed the skin becomes less indurated its color becomes more normal and the whiteness and excoriations disappear.

### RESULTS

There were 24 patients who were entirely free of symptoms for a period of 2 years or longer after having received but one course of treatment. A second group comprising 27 patients showed recurrences at the end of from 10 months to 2 years; a second course (one to three treatments) resulted in no further recurrence during 2 years. A third group of 21 patients showed recurrences at the end of 6 months and in the course of 2 years a second recurrence which finally responded to a third series of treatments. The fourth group of 16 patients recurred periodically every 3 to 4 months but were regularly made comfortable after each series of treatments consisting of from two to four injections. A group of 11 patients showed recurrences every 1 to 2 months and this form of therapy was finally abandoned.

There is no question that the result of injection is prompt relief in almost all cases and this relief as indicated varies from 1 month to more than 2 years. The particular result in any case is very probably merely an indication of the local conditions prevailing. Fifty one per cent show results that may be called excellent and in 22 per cent the results were satisfactory. Even in the most severe cases great relief was obtained for at least a month.

### COMPLICATIONS

No serious complications have been observed after this form of treatment.<sup>14 15 16 17 19 20</sup> In the present series of over 800 separate injections there were five superficial chemical abscesses of small size which were incised without

any further anesthetic and healed without fistula formation. There were also eleven instances of superficial sloughing which caused slight discomfort for several days. Healing took place within 2 to 5 weeks. There were no systemic reactions.

### SUMMARY AND CONCLUSION

Results with Gabriel's modified solution in the treatment of pruritus ani in 100 cases followed over a period of 2 years or longer are described. In 73 per cent the results were satisfactory; in 51 per cent they were excellent and in all instances at least temporary relief was obtained.

The advantages of this form of treatment are as follows: the high incidence of good results; the simplicity of the technique; its freedom from complications and after-pain and its ambulatory character, a great economic factor to the patient.

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isolated instances one encounters excellent results with x-ray therapy

Much more satisfaction has followed the injection of various solutions which act by injuring the nervous supply of the perianal skin. Stone<sup>10, 11</sup> in 1916 was the first to use 95 per cent ethyl alcohol in minim doses, injected just below the perianal skin about 5 millimeters apart throughout the affected area.

Bue<sup>12</sup> used 40 per cent ethyl alcohol. He felt that the patient should be hospitalized, and, if anal disease is present, such as hemorrhoids, fissure or tabs, it must be eliminated and the tissues completely healed before treatment. He injects up to 20 cc of this solution on each side, subcutaneously, in the exact manner as for local anesthesia. The treatment requires constant observation during a period averaging 6 weeks. Great care should be taken following the injection to avoid inflammatory reaction, abscess formation and sloughing. He states, "Although sloughing cannot be avoided in half of the cases in which the injection is given, it is possible to keep it from going too far by careful and diligent measures in all."

Hanco<sup>13</sup> experimented with dilute hydrochloric acid and found that a 1:3000 dilution could be injected with safety. Because of the pain accompanying this injection, the use of this solution must be preceded by the injection of at least 25 cc of 0.5 per cent novocaine. Amounts varying from 2 to 6 ounces are used depending upon the particular case and treatments may be repeated in from 1 to 3 weeks.

The following medicinal solutions in oil have been used for subcutaneous injections: 1. Benacol (a mixture of equal parts of para-amino benzocaine benzoate and phenmethylol in 90 parts of rectified sweet almond oil) by Yeomans et al.<sup>14</sup> 2. Gabriel's<sup>15</sup> original A B A solution (anesthesia 3 per cent, benzyl-alcohol 5 per cent and ether 10 per cent in sterilized oil). 3. Phenol in oil by Goldbacher.<sup>16</sup> 4. Anucaine (5 parts each of benzocaine and phenmethylol, 1 part of butyl amino-benzoate in one eighth part of basic procaine in sweet almond oil) by Gorsch.<sup>1</sup> 5. Gabriel's<sup>15</sup> modified solution (nupercaine base 0.5 per cent, benzyl-alcohol 10 per cent and phenol 1 per cent in 5 cc of sterilized sweet almond oil).

Beginning in 1926 we attempted to treat this condition by the injection of large quantities of quinine and urea hydrochloride, 0.5 per cent subcutaneously in amounts varying from 25 cc to 75 cc. Only a small percentage of cases obtained permanent relief, the greater number having a recurrence of symptoms in from 1 to 3 months. The use of A B A, benacol and phenol in oil solution greatly improved our results. Following the use of these solutions, however, many patients experienced extreme dis-

comfort in the injected area which lasted from several hours to days in some cases and often required sedatives and morphine.

Since Gabriel's modified formula contained the anesthetic, the alcoholic and the phenol treatments combined in one, it offered the most logical oil-soluble solution to be used in ambulatory cases. Anesthesia from nupercaine (pericaine) in watery solution usually lasts from 4 to 6 hours, that from the base lasts even longer. The phenol is added to intensify the anesthetic power of the nupercaine, the alcohol to destroy the nerve filaments supplying the skin. All these medicaments in oil have a prolonged anesthetic effect which generally persists from 2 to 6 weeks. Due to the fact that there is no pain following the injection, no danger to the patient of the formation of large abscesses or great areas of sloughing and no pain to the injection itself except the first sensation of the prick of a needle, this treatment can be administered to the patient in the office. If itching recurs the patient returns for further treatments, fearing neither pain nor incapacitation.

In Frankfeldt's<sup>17</sup> series of 65 cases, based on treatment with this solution, he obtained cures in 40 per cent, marked improvement in 20 per cent and satisfactory results in 20 per cent of cases. The results in the remaining 20 per cent were unsatisfactory.

The present communication presents results obtained in 100 cases treated between 1933 and 1936. Each patient was followed for a period of at least 2 years. There were 59 males and 41 females, varying in age from 20 to 65 years. The greatest incidence (39 per cent) was in the fourth decade.

#### TECHNIC

The perianal skin is cleansed with tincture of green soap and painted with Scott's solution (mercuochrome crystals 2 parts, distilled water 35 parts, acetone 10 parts and alcohol 55 parts) or tincture of merthiolate (1:1000). One ampule of nupercaine-phenol-benzyl alcohol in oil, which has been slightly warmed to facilitate the flow of oil, is drawn into a 5 cc sterile glass syringe through a large caliber needle. The needle is then changed to one of gauge No. 21, 1¾ to 2 inches long. The perianal region is then divided into four quadrants, and usually either the left or right posterior quadrant is chosen first. The patient should lie in the Sims' position, on the side selected for the treatment. The needle is inserted subcutaneously about one half inch outside the affected area. *It must be freely movable at all times.* The solution is then injected in fan shape manner until all the 5 cc have been used. *The injected tissues are massaged gently for about 3 minutes with a sterile piece of gauze, thus assuring an even distribution of the oily solution.* The second

certain individuals possess a relative immunity to such infections. If the blood from such an immune donor is used recovery may occur, while transfusion of blood from nonimmune donors has proved valueless. Such transfusions may prove to be of value in the treatment of puerperal sepsis.

Briefly described, his technique is as follows. The blood serum from several prospective donors is freed from cells by centrifuging. To 0.25 cc samples of the patient's defibrinated blood are added 1 drop of each donor's serum and 1 drop of a broth culture of the streptococcus isolated from the patient. These are mixed in a sealed glass tube and slowly rotated for 30 minutes. A smear is made from the mixture, stained with Wright's stain and the number of intracellular streptococci in twenty-five polymorphonuclear leucocytes and the percentage of cells taking part in the phagocytosis is noted. The donor whose serum shows the greatest phagocytic power is selected for the transfusion.

Much progress has been made in typing streptococci by Lancefield<sup>6</sup> of the Rockefeller Institute, independently and in collaboration with Hare<sup>7</sup> and with Swift and Goodner.<sup>8</sup> Lancefield and her collaborators have worked out a classification of streptococci that divides them into seven groups which she designates by the letters A, B, C, D, E, F and G. Her classification is based on the fact that each of the different groups of streptococci contains a specific carbohydrate called the C substance.

Practically all streptococci pathogenic for human beings such as those of scarlet fever, erysipelas, septic throat and pneumonia, belong in group A. They are also found in the throats of immune carriers. Groups B and C include the streptococci often found in human throats and vaginas that are pathogenic for animals but not for human beings. Group D is normally found in cheese and occasionally in the human throat and vagina. Group E, found in milk, and group F, found in the human throat are probably not pathogenic for either animals or human beings. Group G found in the normal respiratory tract in man, in the monkey in pneumonia and in the dog in otitis, is probably nonpathogenic to human beings.

It is not practicable as yet for the hospital with ordinary bacteriologic facilities to work out the pathogenicity of streptococci in the throats of its entire personnel or even in every case of infection. Lancefield has shown that the ordinary vaginal streptococci are nonpathogenic, so that the routine vaginal or cervical cultures offer little, if any, information of value.

While there is still some doubt as to the specificity of different strains of streptococci, the weight of evidence seems to favor the fact that

at least the streptococci of erysipelas and of scarlet fever are specific. These are the erythrogenic streptococci. It would lead us too far afield to discuss this question further, but, as I shall show, what appears to be bacteriologically the same streptococcus produced in our clinic different manifestations in different years. For example, in 1933 our patients infected in the blood stream with *Streptococcus hemolyticus* lived from 15 to 95 days, while patients infected with what was apparently the same organism in 1934 died within 7 to 9 days.

Whether one makes the daily obstetric visit year after year or goes over the temperature charts of obstetric patients in retrospect, it is glaringly apparent that in the winter or spring of every year there is an epidemic of puerperal infection. At the Boston City Hospital we are on watch for it and try to isolate every case of infection as soon as it develops.

As I have previously stated, it has been definitely shown that the annual rise in respiratory infections is always followed by an increase in puerperal sepsis. The number of the cases and the severity do not necessarily correspond.

The material used in this study consists in the records of the deliveries and puerperia on the Obstetrical Service of the Boston City Hospital over a period of 8 years, 1926 to 1933 inclusive, a total of 19,315 patients. I have examined personally the records of every one of these patients and a large percentage were directly under my care. From the accompanying chart the incidence of mild and severe puerperal infections for the years 1926 to 1934 may be obtained. Of these years only one, 1928, was free from deaths from infection.

Starting in 1926, which was a mild year, there were few infections and only one death although June and November showed an unusual number of severe cases. In 1927 there were a large number of mild infections amounting to 12 per cent of all deliveries, but fortunately with only 2 fatal cases. In 1928, as stated, there were relatively few infections and no deaths. In 1929, following a severe epidemic of respiratory diseases in Boston (see chart 1), there was a large incidence of mild infections, but severe cases were not relatively increased, there were three deaths. The year, 1930, was mild with few severe cases and only two deaths.

In 1931 there was one septic death in January. A severe epidemic began in April with 1 case following a normal delivery dying in 5 days from a *Streptococcus hemolyticus* septicemia. In May 5 cases of severe infection developed, among whom three deaths occurred, all after normal delivery. This epidemic continued into June with two severe infections one following a normal and the other a low forceps delivery, both dying. After June severe infections dropped to an incidence of less than 1

## EPIDEMIC PUERPERAL SEPSIS\*

BY JOHN T WILLIAMS, M D †

OUTBREAKS of puerperal infections occur from time to time in all large clinics, varying greatly in severity and in type in different years. The records of the Boston Board of Health show a regular curve in the incidence of respiratory infections from year to year, the peak months usually being March or April. Puerperal infections in the main follow a similar curve, as previously shown by the writer.<sup>1</sup> An outbreak of respiratory infection in the community is invariably followed by an epidemic of puerperal infection. Walker<sup>2</sup> of the Boston City Hospital and Meleney<sup>3</sup> of the Presbyterian Hospital in New York have shown essentially the same coincidence in surgical wound infections.

After many years of careful observation the writer has come to the conclusion that puerperal infections may be quite sharply divided into two groups. The first are mild infections, in which the temperature rises to 101° or 102° F for from 1 day to several weeks and gradually returns to normal, and in which the patient is at no time seriously ill. These are simply wound infections analogous to mild surgical sepsis, due to avoidable or unavoidable breaks in technique, contamination from excreta or absorption from blood clots and serum. These infections are pre-disposed to by operative delivery, especially cesarean section, hemorrhage, toxemia and poor general condition of patient from any cause. Like the severe type of infection to be described, they are more common during outbreaks of respiratory infection. They are not serious, do not spread from patient to patient if ordinary care is used and do not necessarily require isolation.

The second group includes severe puerperal infections of the epidemic type. Here we are dealing with a disease as malignant as smallpox. This type is almost universally due to infection with *Streptococcus hemolyticus*. Although occasionally sepsis following full term labor may be due to pneumococcus, staphylococcus or other organisms, the predominance of streptococcal infections is so great that for practical purposes other organisms may be excluded. In cases of septic abortion, which are not considered in this paper, the infecting organism may be almost any pathogenic bacterium.

The severe type of puerperal infection is characterized by a sudden rise in temperature to 103° or 104° F, 36 hours to 5 or even 7

days postpartum. The temperature remains elevated and the patient's condition usually grows rapidly worse. These infections usually occur only when there is an epidemic of respiratory infection present in the community. They are extremely contagious, being carried from patient to patient by hands, bedpans, perhaps dishes, in short, by anything handled or used by the septic patient and the nurse who cares for her. All infections occur more frequently after operative delivery than after normal delivery and most frequently after cesarean section.

Infection may enter the body through the placental site, cervical lacerations, perineal lacerations or the decidual surface of the uterus. The course of the infection from each of these four portals is as follows:

1 The placental site. When infection enters here direct transmission into the blood stream is common because of the large blood sinuses in this location and results in a true septicemia with positive blood culture.

2 Cervical lacerations. Infection here enters the cellular tissue of the broad ligament, often by way of the lymphatics, resulting in cellulitis. The blood culture is usually negative.

3 Perineal lacerations. These may occasionally give rise to severe infections, but as a rule the many layers of fascia tend to localize the process.

4 The decidual surface of the uterus. Here infection may be localized by a leucocytic zone with speedy recovery. Extension, however, may be by one of four paths: first, the blood, as in invasions of the placental site, resulting in septicemia; secondly, the lymphatics, resulting in cellulitis; thirdly, the fallopian tubes by direct continuity, resulting in salpingitis or occasionally local or general peritonitis; and, fourthly, the pelvic venous system, resulting in thrombophlebitis with or without secondary pyemia.

Where there is a localized pelvic process with a negative blood culture, the outlook for recovery is good. When the blood stream is invaded by the more virulent types of streptococci, the mortality is extremely high. No treatment seems to have the slightest effect. In our experience transfusions, single or repeated, do no good. Antistreptococcal sera, nonspecific protein therapy and outdoor treatment have made no appreciable difference in the mortality.

Dr. Champ Lyons<sup>4</sup> has recently published a study on transfusions with immune blood in hemolytic streptococcus infection at the Massachusetts General Hospital. He has found that

\*Read before the Obstetrical Society of Boston, January 21, 1936.

†Williams, John T.—Surgeon in Chief for Gynecology and Obstetrics, Boston City Hospital. For record and address of author see "This Week's Issue," page 1043.

fatal termination was much shorter, although bacteriologically the same organism appeared to be responsible.

This epidemic started in January with a patient delivered by cesarean section for placenta praevia who died on the eighth day of a *Streptococcus hemolyticus* peritonitis. This patient was delivered on January 7. Two patients delivered on January 9 developed severe infections but both had negative blood cultures and recovered.

There were no further severe infections until

## CONCLUSIONS

1 Puerperal infections may be divided into simple wound infections and epidemic puerperal infections usually due to *Streptococcus hemolyticus*.

2 Operative vaginal delivery and more especially cesarean section greatly increase the incidence of all types of infection. The mortality is practically the same for operative and non-operative deliveries but much higher after cesarean section (table 1).

Type of Delivery	Total	Mild Sepsis	Severe Sepsis	Deaths
Normal	14 830 (76.8%)*	462 (3.1%)†	72 (0.5%)†	16 (0.1%)†
Operative vaginal	3 944 (20.4%)	173 (4.4%)	56 (1.4%)	4 (0.1%)
Cesarean section	541 (2.8%)	125 (23.1%)	25 (4.6%)	6 (1.1%)

Percentages of total deliveries  
†Percentages of deliveries of that type

TABLE 1 This tabulation shows the numbers and percentages of normal and operative vaginal deliveries and cesarean sections and of mild and severe sepsis and deaths following each type of delivery at the Boston City Hospital for the years 1926 to 1933 inclusive. Note that the percentages of septic deaths are the same for both normal and operative vaginal deliveries but that the percentage of death is much greater following cesarean section.

February the last two mentioned patients having been discharged in the meantime. On February 8 a multipara was delivered normally but some difficulty was experienced with the placenta. There was a rise in temperature on the fourth day to 104° F. Exploration showed a piece of retained placenta in the uterus which was removed with placental forceps. The patient, however, developed a *Streptococcus hemolyticus* blood stream infection and died 18 days postpartum.

Three other patients, one delivered February 13, two on February 14 and all sent to the same ward, developed severe infections. High temperatures developed on the sixth, third and fourth days respectively. Two had positive blood cultures and died. The third, although very ill, had three negative blood cultures and recovered. There were no further infections due, I believe, to the fact that after the first case developed all other patients were promptly isolated. There can be little doubt that the second, third and fourth patients received their infections from the first and as soon as a policy of prompt isolation of all cases of suspected infection was adopted the epidemic was brought to a close.

The Pathological Department was again called in consultation and after an extensive bacteriologic study of catgut dressings, instruments, sterilizing solution and throats of nurses and interns, found spore-bearing bacilli in the sterilizing solution and hemolytic streptococci in the throats of two nurses. The nurses were relieved from duty at once and a check up on the sterilizing solutions at frequent intervals was instituted.

3 Ordinary or even extraordinary aseptic precautions are not sufficient to guard against the epidemic type of infection.

4 No treatment except possibly transfusion of immune blood is of any value in epidemic *Streptococcus hemolyticus* infections.

5 Immediate isolation of all patients showing symptoms suggestive of severe puerperal infection is the chief means at present of preventing the development of epidemics.

6 Culturing the throats of the staff, interns and nurses is not of much value unless the hospital has bacteriologic facilities for typing the streptococci that are found.

7 Careful masking of all delivery room attendants is essential although it is admitted that most of the present-day masks are inefficient.

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## DISCUSSION

DR. ROBERT WEE. There is little I can say from a clinical point of view in a discussion of Dr. Williams' excellent paper. He has made reference to certain facts which are most interesting to the



streptococcus from the nose or throat of the Obstetrician-in-Chief.

**DR. CHAMP LYONS** The remarks of Dr Williams and Dr Nye must make it evident that the intelligent management of hemolytic streptococcus infections demands the special attention of a bacteriologically competent clinician. For the past three years I have been attempting to establish such a department for the study of surgical infections at the Massachusetts General Hospital.

We have had the opportunity of examining positive hemolytic streptococcus blood cultures from some 150 patients. The cultures have been made on horse blood agar, and we have not recognized the alpha prime type described by Dr Nye and recognized by using sheep's blood agar plates. However all the types which have shown true beta hemolysis on horse blood have been found to resist phagocytosis in nonimmune blood and to develop capsules. I am hopeful that we have worked with some of the alpha prime type in this group of positive cultures and that they will fall into the same general group for purposes of working with them in the phagocytic test.

Dr Williams has indicated a seasonal prevalence with annual variation in the incidence of streptococcus infections. During the summer months we are accustomed to finding the 'F' variant of streptococcus which is virulent for man and not for mice. As winter comes on there appears the 'M' variant which is primarily virulent for both man and mice. In 1934 the 'M' variant first appeared in January. In 1935 February, but this year we saw it in September. I have a feeling that the early appearance of the 'M' variant in throat cultures, abscesses and blood cultures presages a dangerous streptococcal season.

Dr Nye has indicated a difference in mortality between the earlier and later decades of life. In studying the natural development of phagocytic antibodies in patients with lymphangitis and cellulitis, it would appear that young individuals develop demonstrable antibodies in the blood about the fifth day. In older individuals these are not demonstrable until the eighth or ninth day.

I have attempted to treat patients with positive beta hemolytic streptococcus blood cultures by transfusing them with blood from donors that shows

a high titre of phagocytic antibodies for the specific type of streptococcus which is causing the infection. In the small series of patients that we have treated we have been able to clear the blood stream of the organisms unless there was an underlying endocarditis or septic phlebitis. Within 36 hours after such a transfusion there has been definite clinical improvement with evidence of localization of the infection. This is consistent with what has been obtained by passive immunization with antibacterial antibodies in other infections. It should be borne in mind that sterilization of the blood stream may be followed by the development of a local lesion in some vital center which may of itself be fatal. The series of cases treated is as yet too small to permit any critical evaluation of this method of treatment but the underlying immunologic considerations are so well established that it is an entirely sound procedure.

The surgeon must accept the responsibility for the prevention of streptococcus infection. Virulent streptococci are harbored chiefly in the nasopharynx. Patients are infected by droplets through the air or indirectly by hands that have been contaminated by such droplets. It is possible that we have not given enough thought to the patient's throat and hands as a source of infection. Our treatment of acute burns has lately been modified to include face masks for the patient, as well as for the attendants until such time as throat cultures have been obtained on the patient. We also make the effort to keep the patient's hands away from the nose and throat and to keep their hands washed after every such contact. It should be emphasized to nurses and attendants that their hands should be washed after every contact with their nose or throat. They do not realize that they may contaminate their hands by simply putting their hands to their mouths when they cough or blow their noses.

At the present time prevention of infection is solely a matter of exclusion. To exclude all who have hemolytic streptococci in their throats would mean a reduction of about one-third of any given hospital staff during the winter months. It would appear from certain studies recently reported that it may be possible to isolate from such a group of positive throats a much smaller group by establishing the virulence or avirulence of the streptococci present in their throats.

## HOME NURSING

BY ALFRED WORCESTER, M.D.

**T**HE training of nurses began in this country in 1872\*. During the next few years nursing schools multiplied amazingly. Their graduates were largely employed in organizing new schools. The hospitals were thus soon supplied with pupil nurses and the economic advantage of such service, as well as its excellence, was a large factor in the rapid increase of American hospitals.

The redemption of hospital nursing from such incompetence and degradation, as now is hardly conceivable ranks only second to the introduction of asepsis in the marvelous advance

of hospital service in the last half century. What more then could be asked of the nursing schools? Well, let us consider this question.

Dazzled by the brilliant achievements in hospital nursing, it was not until recent years that the graduates of these schools realized the insufficiency of such training for nursing service in other fields. Then this recognition of what earlier had been clearly seen in England led to the establishment of American training courses for district visiting and public health nursing. In these specialties the nursing profession has since then made notable progress. But in home nursing there has been no corresponding advance. This sidetracking of an equally important specialty has been due primarily to the neglect of training for such serv-

\* At the New England Hospital for Women and Children where Linda Richards in 1873 received the first American Nursing School diploma.

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bacteriologist and I thought that it might be worth while to consider these in more detail

During the past two years Hare of England has published numerous papers that have contributed a great deal to our knowledge of the bacteriology and epidemiology of puerperal sepsis. Hare, a trained bacteriologist, became interested in the fact that although hemolytic streptococci could be isolated from the vaginas of from 5 to 6 per cent of all cases before delivery, many, in fact most of the cases failed to develop sepsis. He showed that the strains isolated from cases that remained afebrile were readily killed by freshly drawn normal human blood, whereas the strains from cases of puerperal sepsis remained alive and multiplied in such a medium. In a second paper he reported that strains isolated from acute infections of the upper respiratory tract were identical in their behavior in human blood with the virulent vaginal strains and in a third paper he proved that the virulent and avirulent strains could be further differentiated on the basis of certain biochemical reactions.

About this time, Lancefield's work appeared and as Dr Williams has told you, she was able to divide all streptococci into seven serologically distinct groups of which the first, group A, contained the majority of strains that were pathogenic for human beings. Employing Lancefield's technic Hare reclassified his strains with the following results. Of 45 strains from cases of severe sepsis 44 were group A. From 837 normal hospital deliveries hemolytic streptococci were obtained from 85 cases postpartum, but only 2 were group A. One of these cases developed a fatal sepsis while the other remained afebrile. From 855 normal "district" deliveries, hemolytic streptococci were obtained from 13 cases antepartum. None fell into group A and no case developed severe infection.

In his two most recent papers he has shown that group A streptococci can be obtained from the noses and throats of about 7 per cent of all normal individuals and that such strains can be recovered from the stools of about 20 per cent of all nonobstetrical cases with severe streptococcal upper respiratory infection (scarlet fever), although they are never found in stools from cases with normal deliveries.

From these facts it seems reasonable to conclude 1 Infective (group A) strains are only rarely encountered in antepartum vaginal cultures or in postpartum cultures from afebrile cases. 2 Infective strains are identical with those causing upper respiratory infection. 3 Infective strains are implanted in the vagina at or after delivery. 4 The sources of such infective strains in the order of their frequency, are—(a) contact infection from the nasal or oral discharges of attendants (b) cross infection from the nasal, oral or vaginal discharges of other patients and (c) auto-infection from the nasal or oral discharges or feces of the patient.

These clear-cut findings are in my mind somewhat complicated by our belief at the bacteriologic laboratory of the Boston City Hospital that we can differentiate two types of hemolytic streptococci. The first of these is the true beta hemolytic type which produces a definite 'punched-out' zone of hemolysis when cultured on the surface of sheep's blood agar. As you all know a colony of the alpha type streptococcus, *Streptococcus viridans* is surrounded by a zone of greenish discoloration presumably due to the formation of methemoglobin. The second type of hemolytic streptococcus on primary isolation, has a colony which is intermediate between the true beta and the true alpha, and for this reason we have called it atypical alpha or alpha prime—the latter name should not be confused with that proposed by Brown of Baltimore. Surrounding the colony is a zone of true beta hemolysis but this is

bounded peripherally by a narrow zone of alpha hemolysis. After two to five subcultures on blood agar the latter characteristic is lost and the colony becomes typical of a true beta hemolytic streptococcus.

In 59 cases with positive blood cultures for streptococci received during 1935 from all services of the hospital 34 strains were classified in the laboratory as true beta and 25 as atypical alpha or alpha prime. Examination of the clinical records has yielded the following facts. Of the 34 cases with true beta infection 26 died—a mortality of 77 per cent. The fatal cases had an average age of 49 years and an average duration from the first positive blood culture to death of 38 days. The recovered cases had an average age of 14 years with a maximum of 28 years. Furthermore 24 cases were admitted during the first four months of the year, 2 during the middle four and 8 during the last four. Of the 25 cases with atypical alpha or alpha prime infection 11 died—a mortality of only 44 per cent. The fatal cases had an average age of 41 years and an average duration of 117 days. The recovered cases had an average age of 29 years with a maximum of 50 years and the incidence of all cases during the three four month periods of the year were 10, 7 and 8 respectively.

These clinical facts bear out our assertion that there are two different types of hemolytic streptococci. It would seem to appear true that the atypical alpha or alpha prime streptococci are less virulent as measured by mortality and by duration of illness and do not have a seasonal incidence, like the true beta type which parallels that of acute upper respiratory infections. At present we are saving strains of this type with the idea of determining whether they belong in Lancefield's group A.

I have mentioned this apparently less virulent type of streptococcus because a relatively large percentage of infections on the obstetric and gynecologic services are due to this organism. Of the 34 cases last year with bacteriemias due to beta hemolytic streptococci there were only 3 (less than 10 per cent) from these services whereas of the 25 cases with bacteriemias due to the less virulent type 7 (over 25 per cent) were from the obstetric and gynecologic services. Furthermore, two of the epidemics of which Dr Williams has spoken were due to streptococci of the less virulent type. If I remember correctly there were, in one of these (1932-33) 8 cases with positive blood cultures. One case died fairly acutely 4 died after an illness of from 2 to 13 weeks and the other 3 recovered. The eventual mortality rate in this epidemic was exceptionally high.

From the bacteriologic point of view the following precautionary measures against puerperal sepsis seem indicated. 1 Weekly nose and throat cultures of all attendants with exclusion from attendance of all with positive cultures, unless the strain is proved not to be a group A streptococcus. 2 Exclusion from attendance of all with acute upper respiratory infections until nose and throat cultures are negative. 3 Nose and throat cultures of all patients on admission and subsequent isolation of those with positive cultures. 4 Proper sterilization of bedpans, hot water bags, packs, instruments and so forth.

In conclusion, I will outline the procedures that are to be recommended in the event that a case of puerperal sepsis develops on a ward. 1 Immediate isolation of the case. 2 Nose and throat cultures of all attendants with exclusion from attendance of all showing positive cultures. 3 Nose, throat and lochia cultures of all patients, with isolation of those with positive cultures. Do not blame the catgut or dressings! It is much more apt to be a



streptococcus from the nose or throat of the Obstetrician in Chief.

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ice Just as hospital training was formerly considered sufficient for visiting nursing, for which special training is now considered indispensable, so the same mistaken idea persists that hospital training suffices for home nursing.

As a result of this misconception there are now thousands of graduate nurses without full employment while countless more thousands of home patients are without the needed nursing care. Not is this true only of the poor and of families having slender means. To no small extent it is also true of those who could well afford to pay the prevailing wages of graduate nurses and would willingly do so could they find nurses who are expert in home nursing and really like it. Such nurses are scarce.

The young graduates of the hospital schools are fully able to transform homes into temporary hospitals. Sometimes this is what is needed for the patient. But such exigencies rarely occur. In the great majority of cases such impromptu hospitalizing is what is neither wanted nor needed. In this usual run of cases the nurse who has had only hospital training is from the start at a great disadvantage. She does not even know what is wanted. For example, in the hospital wards the visits of her patient's family, though limited to certain hours of certain days, were tolerated as unavoidable interruptions. How can a nurse with only such training realize that in the home her duty is to share with the family the care of their patient? In the hospital she has learned how to take care of isolated individuals. But in the home where the patient is one of the family a very different kind of nursing is needed. And, for this service special training even if not absolutely essential is at least of enormous advantage both to the nurse and to the family she serves. This fact is not so generally recognized as it should be even by the medical profession. This is strange, for physicians well know the disadvantages of inefficient nursing in their patients' homes.

Unless the doctor can be sure of having his orders intelligently and faithfully executed what chance is there for the success of his treatment of the case? And without an adequate supply of nursing service upon which they can rely is it any wonder that doctors nowadays often favor the removal to the private hospitals of patients who, with proper nursing, would do just as well and certainly be more comfortable if left in their own homes?

Like every other art, the art of nursing patients in their homes can be learned in the hard school of experience. But it can be learned far more easily and perfectly by imitation, that is, by practice under teachers who are themselves masters of the art. If this fact be admitted, it necessarily follows that before undertaking

home nursing, nurses should have the opportunity for special training in this specialty. Upon this conviction the Waltham Training School for Nurses was founded, and for half a century it has struggled against the contention of the leaders and organizations of American nurses that hospital training is sufficient for the practice of all other kinds of nursing.

Some twenty or more years ago, when seeking for Waltham nurses the privilege of registration in New York, the School paid for a survey by one of the official examiners of training schools for the New York Regents. Her main criticism was that if Waltham patients were not so well supplied with nursing service in their own homes more of them would have to go to the hospital, thus affording larger opportunity for the hospital training of our pupil nurses. Such rejection of our ideals would have been still harder to bear had not the School been following Florence Nightingale's advice and receiving her approbation. And as our preliminary course for probationers and our training course in visiting nursing had finally been adopted by other schools, we continued hoping that our belief in the necessity of special training for home nursing might also be accepted by the leaders of American nursing education. But with the continued increase in the educational requirements for state registration, which already embarrasses the hospital schools, such hopes grow less likely of fulfillment. The more probable alternative seems now to be that such training will have to be given in postgraduate courses just as special training now has to be given for visiting and public health nursing.

The hindrances to such a development are obvious. For as yet there are no organizations to ensure regular wages and free hours for nurses who are engaged in home nursing. But the main hindrance to such postgraduate courses is the general distaste of graduate nurses for home nursing. This in large part is due to their not having been taught this specialty. Very naturally nurses like best the services for which they have been best trained. More than that it is a fair question if hospital training does not actually tend to unfit the nurse for home nursing. Even if in her own home she has been taught the art of housekeeping, in the hospital such lessons often seem to be unlearned. In the home, for examples, a towel after once used for drying well-washed hands does not have to be relaundered, the lighting and heating of the house also have to be conserved, all food waste has to be avoided, and all sorts of makeshift material have to be used. But the inconvenience of such necessary household economies is as nothing compared with the necessity of working *with* the family in the case of *their* patient. Surprising as it may seem to the nurse, the rough

hands of the farmer may convey to his sick wife or child far deeper comfort than massage by strange hands however softer and more skilful.

Perhaps the most important thing for the hospital nurse to unlearn is the habit of commanding. Ward maids and orderlies can be ordered by the nurses to do this and not that. Not so can be the household servants. Nor can members of the family be reminded of their ignorance without chilling their cooperation. Indeed, in home nursing one of the requisite services of the nurse is that of teaching the family how to take care of their patient. Such possible extension of the art of nursing by tactful instruction of the family, serves not only their present but also their future needs. And the adept in home nursing must therefore have learned a higher joy than that of personal prowess, namely, the joy of seeing her patient perfectly nursed, under her instruction by those most dear to him. In fact this ability of the nurse to keep herself in the background which never can be learned in the hospital wards is nevertheless, for home nursing an angelic accomplishment. The list of essential qualifications for excellence in home nursing might easily be extended beyond our present limits. But perhaps enough has been said about the necessity of special training in home nursing for such service. Two further questions await discussion. First. What need is there for more home nursing than is now available, and secondly, how can this need be met?

Deplorable as it may seem to modern doctors and nurses, there are still many folks who would rather have their babies born in their own homes than in a hospital and so too when they themselves or those dearest are sick even if near to death these unconverted people (who by the way constitute nine-tenths of our population) still prefer home care however inefficient it may be if compared with that given in the best of hospitals. This is more true of those who live in impoverished homes than it is of those who live in modern palaces. But only a small proportion of these home loving families can afford to pay the prevailing wages of trained nurses. In the cities and larger towns much help can be had from the short visits of the District Nurses, and in the sparsely settled country neighbor-nursing is still available. And yet only a casual survey is needed to convince anyone that in the homes of our people there is a tremendous need for more and better nursing for the helpless sick and suffering.

How can this need be met? The short answer to this important question is "By organization of all existing and prospective nursing power." This of course needs amplification. In the first place it is to be noted that in only a fraction of the total needs of home nursing is there need of fully trained nursing service. Just as in the hospitals, where far the greater part of the nursing is given by pupil nurses so and with the same economic advantage a large part of the needed home nursing might be as perfectly supplied by nurses in process of training for the practice of this specialty. Such use of pupil nurses by many visiting nursing organizations affords a still more apposite example for similar organizations for home nursing which could easily be established even in our villages. Far easier it is to start such an organization and less costly for any community will be its maintenance, than the starting and maintenance of a small hospital. Both are needed, but the organization for home nursing is needed first.

With a few well-trained nurses on salary to serve where such service is essential who will also superintend the service of pupil nurses and that of untrained neighbors wanting such employment, such an organization as we here have roughly outlined could begin tomorrow in any community. For all the service thus given the beneficiaries, if able to pay, must of course pay full charges, but less or nothing if such reductions are needed. The cost above its earnings of carrying on this work ought of course to be provided by family insurance against the possible need of medical and nursing service. But until the excellent Brattleboro plan is more generally adopted the cost of adequate home nursing must be provided by good neighborliness for those unable to pay for it.

In any community or at any rate on any nursing registry, it will not be hard to find nurses who in one way or another have become proficient in the art of home nursing. Even if in demand by families they have previously served such nurses may be very willing to accept permanent homes and regular salaries in a nursing service organization. But it may not be such an easy matter to find nurses who are also able and willing to teach their art to others. There is therefore need of schools for graduate nurses where both the art of home nursing and the art of teaching it shall be taught. Such a course the Waltham Training School for Nurses is now offering.

## VERMONT STATE MEDICAL SOCIETY

## HOUSE OF DELEGATES

THE Preliminary Meeting of the House of Delegates of the Vermont State Medical Society was called to order by the President, Dr F J Lawliss, at eight o'clock, Wednesday evening, October 14, 1936, on the roof garden of the Hotel Vermont, Burlington, Vt

President Lawliss appointed as the Credentials Committee Dr E A Hyatt, Chairman, Dr R E Avery and Dr C G Schurman, and requested members to present their credentials to this committee

The credentials committee reported 31 delegates present, out of an authorized 38 delegates

The Secretary, E J Rogers, called the roll. Those present were as follows

## ADDISON COUNTY MEDICAL SOCIETY

F C Phelps Vergennes  
C S Paine, Bristol

## BENNINGTON COUNTY MEDICAL SOCIETY

None present at this session

## CHITTENDEN COUNTY MEDICAL SOCIETY

H. E Upton, Burlington  
H A. Durfee, Burlington  
J L. Berry, Richmond  
W F Rogers, Underhill  
C H Beecher, Burlington  
E D McSweeney, Burlington  
G I Forbes, Burlington  
F J Arnold, Burlington

## FRANKLIN COUNTY MEDICAL SOCIETY

L E Sample, St. Albans  
E A. Hyatt, St. Albans  
F J Lawliss, Richford

## LAMOILLE COUNTY MEDICAL SOCIETY

B L Emerson, Johnson

## NORTHEASTERN COUNTY MEDICAL SOCIETY

M J Paulson, Danville  
P C Templeton, Irasburg  
C G Schurman, Newport  
W A. Sargent, Newport  
E T Wilson, St. Johnsbury

## RUTLAND COUNTY MEDICAL SOCIETY

Francis Quigley, Rutland  
E J Rogers, Pittsford  
B F Cook, Rutland

## WASHINGTON COUNTY MEDICAL SOCIETY

C E Brady, Barre  
W R Harkness Montpelier  
R. E Avery, Barre  
L B Allen, Post Mills

## WINDHAM COUNTY MEDICAL SOCIETY

R. E McSweeney, Brattleboro  
O A Burton Westminster

## WINDSOR COUNTY MEDICAL SOCIETY

Paul C T Bacon, Springfield

President Lawliss stated that, this being the first year that the House of Delegates has met prior to the opening of the scientific sessions of the Vermont State Medical Society, the meeting would be conducted in the same manner as the regular meetings of the House of Delegates had been in the past

Article 3 of the Order of Business, the Secretary's report, Dr E J Rogers stated would be presented at a later time, it being in the possession of the Secretary of the Vermont State Medical Society

Article 4, Reports of Committees, were taken up, the first report called for, being that of the Publication Committee Supplementing the printed report, Dr W G Ricker, Chairman of this Committee, stated that the committee had continued, as in the past few years, the arrangement of the Society with *The New England Journal of Medicine*, and added that later in the evening more would be said about this

The report of the Executive Committee was called for, and Dr Ricker, Secretary of the Society, stated that the program for this year's Society meeting was the report of this committee

President Lawliss called for the report of the Legislative Committee Dr C H Beecher, Chairman of this committee, stated that there was no printed report, and added "The committee attended the session of the legislature in Montpelier on the day when there was a hearing on the bill before the Senate to license naturopaths, that the bill was eventually killed after having passed the Senate, that Doctors Tobin and Quinn, both members of the legislature, did very effective work in seeing that the bill did not pass The argument against its passage, as presented at the hearing, was that the bill was unfair to the students who are studying medicine in that the requirements for admission to the practice of naturopathy were less than for the study and practice of medicine"

The report of the Committee on Medical Education was called for, and it was stated that there was none further than what had already been printed

The report of the Necrology Committee was read, following which the House stood in one minute's silence as a tribute to deceased members

President Lawliss called for the report of the Medico-Legal Committee, and Dr Ricker stated that it had been sent to him but for the time being it had been mislaid Dr Hyatt, Chair-

man of this Committee, stated there had been one lawsuit that went to trial, and resulted in a verdict against the defendant. Several other minor cases were pending.

President Lawliss called upon the Secretary of the House of Delegates, Dr E J Rogers, to read a communication from Dr J N Jenne.

Secretary Rogers read the following communication:

Burlington, Vt  
October 2, 1936

Honorable House of Delegates  
Vermont State Medical Society

Gentlemen:

I am hereby tendering my resignation as a member of the Medico-Legal Committee of this Society after a period of incumbency of about twenty five years. I take this opportunity of expressing my deep appreciation of the confidence of the Society during this long period. I feel that I should now be excused from this service which has been performed willingly, happily, and for some reasons I feel, successfully. I think, however, that the time has come when a little new blood should be infused into the Committee.

As I review the work of the Committee from its beginning through these long years, it does seem to me that we have made some very distinct advancement. We have had a very fortunate experience in the last few years. I cannot but feel that it is due, in a large measure, to the attitude that the Committee and the Society have taken in medico-legal cases—that being one of absolute fairness in all cases where there was a justifiable claim against the practitioner and one of firmness against all claims that seemed unfair or unjust to the doctor. The reports of the Secretary of the Committee and the Treasurer of the Society will disclose the present status of the Committee with respect to pending cases and the state of our fund.

Very respectfully submitted,

J N JENNE, MD

President Lawliss stated that Dr Jenne and Dr Hyatt had both served on the Medico-Legal Committee ever since its inception, and that the committee was originally formed at the suggestion of Dr Hyatt.

Dr Hyatt moved that the House of Delegates through its Secretary, express to Dr Jenne the thanks and appreciation of the Society for the fine work he had done on this committee during the past twenty-five years. The motion was seconded, and so voted.

President Lawliss called for the report of the Committee on Health and Public Instruction. No report was presented.

President Lawliss asked if there were any other committees that wished to report at this time.

In response to this Dr Beecher said: "There is one committee that was asked to find out about the cost of sending *The New England Journal of Medicine* to each member of the Society once a week instead of once a month." Secretary Rogers said that matter would be

taken up in the report of the Secretary of the Vermont State Medical Society.

Under Article 5, Unfinished Business, none was presented.

Under Article 6, New Business, (a) Place of next Annual Meeting, it was stated that invitations had been received from Bennington and St Johnsbury. There being no objection, the President referred this to the Executive Committee to decide. Under (b) of this Article, "Other Business", Dr Ricker, Secretary of the Vermont State Medical Society, was given the privilege of the floor and read his report as printed, going into detail on some of the matters mentioned therein and adding that the publishers of *The New England Journal of Medicine* had offered to send 52 issues of the *Journal* for three dollars additional.

Dr Beecher moved that the President and Secretary of the Vermont State Medical Society, also the President-Elect of the American Medical Association, be allowed to sit in this meeting of the House of Delegates. The motion was seconded and so voted.

Dr Beecher moved that the House of Delegates express to Secretary Ricker its appreciation of the untiring labor he has performed in behalf of the Vermont State Medical Society over a period of some twenty years, and in making the Society an efficient unit of the American Medical Association. The motion was seconded and so voted.

It was moved that the report of the Secretary of the Society be accepted. The motion was seconded and so voted.

Proposed amendments to the By-Laws and Regulations of the House of Delegates were discussed at length, and President-Elect Upham of the American Medical Association, was asked to outline the practices of that organization.

Dr Upham stated, in substance, that delegates and alternates to the American Medical Association are elected by state societies, that if a delegate cannot go he signs over his card to his specified elected alternate, if neither one can go then the matter is presented to the Secretary and President of the state organization, who recommend, or appoint someone to fill that place, that it is then taken up by the credentials committee and presented to the House of Delegates, which either authorizes, or does not authorize, the seating of that person, as the House sees fit, for legally only the elected delegate and specified alternate can represent their respective societies. It is always within the power of the House to seat anyone as an alternate.

In order to raise the salary of the Secretary of the Vermont State Medical Society, Dr Hyatt moved to amend Section 3 of Article 1, in line 6, of the By-Laws of the Vermont State Medical Society by striking out the word "two" and

inserting in lieu thereof the word "four" (Page 29, printed "Constitution, By-Laws and Reports Vermont State Medical Society, October 1936") This motion was seconded and so voted

Dr Hyatt moved that the amount allowed for the Legislative Committee be increased to a sum not to exceed \$500, to cover the Committee's necessary expenses, the money to be paid out by the Treasurer on presentation of properly prepared vouchers. The motion was seconded and so voted

On behalf of the Chittenden County Medical Society, Dr H A Durfee offered the following resolution

**RESOLVED** That a committee of three be appointed by the Chair to confer with the Commissioner of Industries and representatives of the Vermont Manufacturers Association with a view to correcting the defects of the existing Workmen's Compensation Act —

**RESOLVED** That this committee be chosen as follows: one member from the roster of the House of Delegates, one member from the Vermont State Medical Society at large and one member of the State Society who shall represent the interests of the Hospitals of the State

In connection with this resolution it was suggested that the Committee confer with the representatives of the Insurance Carriers and from them obtain all possible statistical information prior to the proposed conference with the Commissioner and the Manufacturers' representatives

Dr Beecher moved the adoption of this resolution as presented. The motion was seconded, and the resolution was adopted

President Lawliss appointed as the committee of three, called for in this resolution to confer with the Commissioner of Industries: Dr E A Tobin, Chairman, Dr L E Sample and Dr T S Brown

As a committee to put into proper form the various proposed amendments, and present the same at the regular meeting of the House of Delegates on Thursday, October 15, 1936, President Lawliss appointed Dr C H Beecher, Chairman, Dr E A Hyatt, and Dr E J Rogers, stating that Dr Ricker, the retiring Secretary of the Society, will sit with this committee. Dr Rogers requested that the President of the House of Delegates also sit with this committee

Under Article 7 of the Order of Business the "Election of Officers for the Society", for the ensuing year, the Chair asked if the House of Delegates wished to make nominations from the floor or to refer this matter to a nominating committee

Dr Beecher moved that nominations for President and Secretary be made from the floor. The motion was seconded and so voted

For President of the Society for the ensuing year, Dr Hyatt nominated Dr W G Ricker. The nomination was seconded and so voted

For Secretary of the Society for the ensuing year, Dr Beecher nominated Dr A Bradley Soule, Jr., of Burlington. The nomination was seconded and so voted

It was then moved that the Chair appoint a nominating committee to bring in nominations for the remaining officers and committees for the Society, and officers for the House of Delegates, at the regular meeting of the House on Thursday, October 15, 1936. The motion was seconded and so voted. The Chair appointed as such nominating committee Dr E A Hyatt, Chairman, Dr Hiram Upton and Dr B F Cook

There being no further business it was moved that the meeting adjourn. The motion was seconded and so voted, and the Preliminary Meeting adjourned

The Regular Meeting of the House of Delegates of the Vermont State Medical Society was called to order by President F J Lawliss at one o'clock, Thursday afternoon, October 15, 1936, at the Fleming Museum, Burlington Vt

Upon vote of the members present, the following alternates were seated in place of the regular delegates

#### WASHINGTON COUNTY

Dr H B Whiting for Dr W W Angell

#### BENNINGTON COUNTY

Dr F J Hurley for Dr H S Goodall

#### RUTLAND COUNTY

Dr Stewart Ross for Dr O F Clough

President Lawliss called for the reading of the minutes of the Preliminary Meeting of the House of Delegates, held Wednesday evening, October 14, 1936 at the Hotel Vermont

Secretary Rogers stated that unless there was objection, he would not read these minutes in full, that the proposed amendments to the By-Laws and Regulations of the House of Delegates, and one proposed amendment to the By-Laws of the Vermont State Medical Society, had been referred to a committee composed of Dr C H Beecher, Chairman, Dr E A Hyatt and Dr E J Rogers, to put them into proper form for presentation at this meeting

For this committee Secretary Rogers read the following report

Your Committee, appointed to put into form the proposed amendments to the By-Laws and Regulations of the House of Delegates, and one proposed amendment to the By-Laws of the Vermont State Medical Society and to submit the same to the Regular Meeting of the House of Delegates on Thursday, October 15, 1936 reports as follows

That paragraph 1, of the By-Laws and Regulations of the House of Delegates, be amended to read as follows

1 The officers of this body shall consist of a President and two Vice-Presidents all of whom shall be elected from members of the Vermont State Medical Society. The Secretary of the Vermont State Medical Society shall act as Secretary of the House of Delegates

That paragraph 2 of the "By-Laws and Regulations of the House of Delegates" be amended to read as follows

2 The duties of Officers shall be the same as those of similar officers in other like organizations

That paragraph 3 of the "By-Laws and Regulations of the House of Delegates" be amended to read as follows

3 The first session of the House of Delegates, at each annual meeting of the Society shall be held at 8 p. m. of the evening of the day preceding the first scientific session. The second session shall be held at one p. m. of the first day of the scientific sessions

That a new paragraph, to be number 4 be added to the "By-Laws and Regulations of the House of Delegates" to read as follows

4 No new business shall be introduced at the second session except by unanimous consent.

That a new paragraph to be number 5 be added to the By-Laws and Regulations of the House of Delegates" to read as follows

5 No member of the House of Delegates or his alternate shall be seated unless certified by the President and Secretary of his County Society to the Secretary of the Vermont State Medical Society on or before September twentieth.

That a new paragraph, to be number 6 be added to the "By-Laws and Regulations of the House of Delegates" to read as follows

- 6 (a) The Secretary of the Vermont State Medical Society shall furnish to each delegate a colored credential card containing his name and the name of his alternate
- (b) The Secretary of the Vermont State Medical Society shall furnish to each alternate a white credential card containing his name and the name of the delegate for whom he is an alternate
- (c) If a delegate is unable to attend the sessions of the House of Delegates he should notify his alternate

Dr Cook moved that all of the proposed amendments be adopted as read. The motion was seconded and was so voted.

Secretary Rogers read the following proposed

amendment to the "By-Laws of the Vermont State Medical Society"

'To amend Section 3, of Article I, in line 6 by striking out the word 'two' and inserting in lieu thereof the word 'four' (Page 29, 'Constitution By-Laws and Reports, Vermont State Medical Society, October, 1936')"

Dr Beecher moved the adoption of this proposed amendment as read. The motion was seconded and was so voted.

Dr Beecher moved that the Secretary of the Society be instructed to send a copy of these proposed amendments to the Presidents and Secretaries of the County Societies. The motion was seconded and so voted.

Dr Cook moved that the Society pay the expenses of its delegate to the American Medical Association for the year 1936-1937. The motion was seconded and so voted.

The nominating committee submitted the following report

"In addition to W. G. Ricker being elected President and A. Bradley Soule, Jr., Secretary of the Vermont State Medical Society the nominating committee submits the following list of nominees for officers, committees and delegates for the ensuing year

#### VICE PRESIDENT

W. J. Upton Burlington

#### TREASURER

David Marvin Essex Junction

#### AUDITOR

Peter P. Lawlor, Burlington

#### COUNCILORS

2nd District—G. G. Marshall Rutland  
4th District—A. M. Cram Bridgewater

#### EXECUTIVE COMMITTEE

A. B. Soule Jr. Burlington  
W. B. Fitch St. Johnsbury  
E. M. Cleasby Orleans

#### PUBLICATION COMMITTEE

A. B. Soule Jr. Burlington  
P. A. Goddard Morrisville  
H. E. Upton Burlington

#### LEGISLATIVE COMMITTEE

C. H. Beecher Burlington  
E. A. Tobin Brattleboro  
E. J. Quinn Castleton

#### MEDICAL EDUCATION

C. G. Abell Enosburg Falls (3 years)  
N. R. Caldwell Burlington (2 years)  
S. S. Eddy Middlebury (1 year)

#### NECROLOGY COMMITTEE

B. D. Adams Burlington  
G. G. Marshall Rutland  
H. L. Pierce Swanton

#### MEDICO-LEGAL COMMITTEE

E. A. Hyatt St. Albans (1 year)  
Stewart Ross Rutland (2 years)  
F. E. Farmer St. Johnsbury (3 years)

## HEALTH AND PUBLIC INSTRUCTION COMMITTEE

B F Cook, Rutland  
F J Lawliss, Richford  
A C Black, Brattleboro  
A L Patch, Windsor  
W W Angell, Randolph

## NOMINATIONS TO STATE BOARD

F J Lawliss, Richford  
B F Cook, Rutland  
S S Eddy, Middlebury  
Roland McSweeney, Brattleboro

## DELEGATES

Maine—John Stewart, Bellows Falls  
New Hampshire—M J Paulson Danville  
Massachusetts—A A Cheney, Lyndonville  
Rhode Island—A L Fogg, Burlington  
Connecticut—John Trotter Bennington  
New York—Leon Sample, St Albans  
American Medical Association  
A B Soule, Jr, Burlington  
C C Abell, Enosburg Falls, Alternate

## ANNIVERSARY CHAIRMAN

Frank E Farmer, St. Johnsbury

## OFFICERS OF THE HOUSE OF DELEGATES

*President*, F J Lawliss, Richford  
*First Vice-President*, Ralph Seeley, Rutland  
*Second Vice President*, E D McSweeney, Burlington  
*Secretary*, A B Soule, Jr, Burlington

Dr Beecher moved that the report of the nominating committee be accepted and adopted as presented. The motion was seconded and so voted.

The President declared the nominees named therein elected to the respective offices and committees for which they were nominated.

Dr Beecher moved that the House of Delegates approve and adopt all of the work that was done at the unofficial Preliminary Session of the House held on Wednesday evening, October 14, 1936 at the Hotel Vermont.

The motion was seconded and so voted.

President Lawliss announced that the Executive Committee had decided to hold the 1937 meeting of the Society at St Johnsbury.

There being no further business, Dr Beecher moved that the House of Delegates adjourn. The motion was seconded and so voted.

Adjournment

## MISCELLANY

### VERMONT DEPARTMENT OF PUBLIC HEALTH SEPTEMBER, 1936

The following communicable diseases were reported to the office of the Department of Public Health during the month of September: measles 9, German measles 1, scarlet fever 10, chickenpox 17, mumps 21, whooping cough 107, undulant fever 3 and typhoid fever 2.

The Laboratory of Hygiene made 2,055 examinations, the details of which are as follows:

Examinations for diphtheria bacilli	71
“ “ Widal reaction of typhoid fever	54
“ “ undulant fever	80
“ “ gonococci in pus	164
“ “ tubercle bacilli	134
“ “ syphilis	763
“ of water, chemical and bacteriological	212
“ “ water, bacteriological	263
“ “ milk, market	152
“ “ milk, submitted for chemical only	0
“ “ milk, submitted for microscopical only	5
“ “ foods	1
“ “ drugs	3
“ for courts, autopsies	3
“ “ courts, miscellaneous	38
Autopsies to complete death returns	2
Miscellaneous examinations	55

The Director of the Division of Venereal Diseases reports 51 cases of gonorrhea and 75 cases of syphilis. Six hundred and fifty three Wassermann outfits and three hundred and eighty slides for gonorrhea were distributed from this Division.

The Crippled Children's Division reports a total of two hundred and six patients seen, two hundred and thirty-eight home visits made, six calls on doctors and one hundred and eighty five Social Service calls made. Four patients were admitted to the Audubon Hospital and one discharged. Five patients were admitted to the Children's Hospital and one discharged, and one patient was admitted to and discharged from the Massachusetts General Hospital. Eighty four pieces of apparatus were fitted, forty two orthopedic corrections to shoes were made and seven pieces of apparatus were repaired. The Vocational Worker of this Division reports sales for the month amounting to \$351.36.

The Director of the Division of Public Health Nursing reports that most of the month has been spent in organization work. Two new units have been established, one in Addison County and one in Windham County. The WPA nursing project is still continued with thirty names on the payroll. Two hundred and sixty one baby booklets, 1,080 diphtheria consent cards and 641 birth notifications were mailed during the month.

The Director of Maternal and Child Health reports an active month with many conferences and medical meetings attended. Dr DeLee's Normal Labor Films have been shown at several training schools for nurses and three lectures were given as a part of the Refresher Courses in Obstetrics and Pediatrics.

### ANNOUNCEMENT

Clarence F. Ball, M.D. announces the removal of his offices to 23 Washington Street, Rutland Vermont with John D. Southworth, M.D., as office associate.



CASE RECORDS  
of the  
MASSACHUSETTS GENERAL  
HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 22481

PRESENTATION OF CASE

A 55 year old Norwegian asbestos worker was admitted complaining of pain in the abdomen and back.

For about 5 years the patient had occasional backaches caused by standing at work throughout the day. These were relieved by a night's rest. Nine months ago, however, he began to experience pain in the region of the lumbar spine which radiated up and down the back. The pain was aching and constant, rarely sharp and stabbing in character, and was not relieved by bed rest or change in position. It occasionally radiated directly anteriorly without encircling the body and was more severe in the left upper quadrant. It was frequently aggravated 3 to 4 hours after meals. Occasionally there was a sensation of heaviness in the stomach shortly after the ingestion of food. This was relieved initially by baking soda but for 2 months such treatment was unavailing. Bowel movements, following the administration of Epsom salts, and gaseous eructation not infrequently afforded some relief. His appetite became poor and there was occasional morning nausea and infrequent emesis after breakfast. Constipation was progressive during his illness and there was diminution of weight from 125 to 105 pounds. Associated with the weight loss there were weakness and fatigability. There was no diarrhea or melena.

Physical examination showed a well-developed, thin and weak-looking man with evidence of considerable weight loss. The skin was loose and dry but the color was normal. The fundi exhibited increased vascular light reflexes and some venous nicking but were otherwise negative. The vertebral column showed generalized limitation of motion without localized tenderness. The heart was not enlarged and its rhythm was regular. A systolic murmur was audible at the apex and the first sound in this region was reduplicated. The blood pressure was 160/110. The lungs were resonant and an occasional moist rale and coarse wheeze were audible at either base. The abdomen was scaphoid and there

was a firm, nodular, tender, immovable mass which extended from the left costal margin to the level of the umbilicus and from the anterior axillary line to the midline. This did not move with inspiration. The percussion note over this region was dull but the remainder of the abdomen was negative. Slight tenderness was elicited in both costovertebral angles. Rectal examination showed a hard, slightly movable mass obtruding upon the posterior rectal wall but the prostate was not remarkable.

The temperature was 99.5°, the pulse 94. The respirations were 24.

Examination of the urine was negative. The blood showed a red cell count of 3,800,000, with a hemoglobin of 70 per cent. The white cell count was 9,040, 73 per cent polymorphonuclears. Repeated stool examinations were essentially negative and gave no reaction to the guaiac test. The serum protein was 4.8 per cent and the nonprotein nitrogen of the blood was 36 milligrams. A van den Bergh and a Hinton test were negative. The serum chlorides were equivalent to 90 cubic centimeters N/10 chloride per 100 cubic centimeters. Daily gastric aspiration showed 8 to 40 ounces of clear yellowish fluid with a slightly fecal odor. Guaiac tests of this fluid were negative.

X-ray examination of the back showed evidence of very marked hypertrophic arthritis. An intravenous pyelogram showed normal kidney pelves and ureters. The kidneys were likewise normal in size and shape. A chest study exhibited a low diaphragm but normal respiratory motion. There was slight mottling within the midlung field and the hilar shadows appeared slightly enlarged. There were multiple areas of calcification in both hila and in the peritracheal region. The heart and aorta were normal. Plain films of the abdomen showed a large amount of gas in the stomach but no dilated loops of intestine. A barium enema passed the ileocecal valve without delay. The palpable mass was not connected in any manner with the colon. A gastrointestinal series showed a normal esophagus. The rugae of the stomach were moderately hypertrophied but there was no other evident abnormality. The duodenal cap was large and showed increase in size of its rugae.

During the succeeding week the patient became unable to ingest food, vomited occasionally, and gastric aspiration withdrew increasing amounts of fluid and some gas. On the eighth hospital day a proctoscopy up to 15 centimeters above the anus showed a peculiar tapioca-like, glistening and translucent infiltration of the rectosigmoid. A rectal examination elicited the presence of a large hard mass the size of a plum which lay anterior to the rectum and displaced it backward. Subsequently the patient was treated palliatively and received fluids paren-

terially He became progressively weaker and died on the eighteenth hospital day

#### X-RAY INTERPRETATION

DR AUBREY O HAMPTON Here is the stomach and I have to accept the report that all it showed was thickening of the mucosa The mucosa is definitely thickened and the stomach seems small and short, and it empties rapidly It changes in shape I do not think it is rigid Here is a film of the gas filled stomach It is large there (Indicating)

The kidney outlines in the intravenous pyelogram showed nothing I do not see the mass in the pelvis or any mass in the upper abdomen We did not have a film of the colon with complete filling This is a post evacuation film only The rectum is in normal position I do not see anything there In all these films the abdomen looks dense, rather homogeneous, large and distended The spine shows very little I should say there are only moderately advanced hypertrophic changes instead of marked ones The film of the esophagus and the lateral view of the chest are normal His chest shows fairly definite evidence of pulmonary fibrosis and enlargement of the glands He was an asbestos worker so probably it is asbestosis Some of these deposits seem to be in the costal cartilages instead of the glands In the lateral view, however, there are several quite definitely calcified glands, and this does not occur with asbestosis generally This is not an advanced case I can only say that the findings are consistent with asbestosis

#### DIFFERENTIAL DIAGNOSIS

DR ARTHUR W ALLEN This is the kind of patient we would like to examine rather than to have an abstract of the history from which to make a diagnosis The symptoms of his backache for 5 years I suppose can be accounted for on the basis of arthritis The fact, however, that he had constant backache and pain radiating from back to front over a period of 9 months would make me feel that this pain was in some way to be accounted for by the mass, the palpable tumor I guess there can be no question but that this mass is a malignant one with metastases to the pelvis involving the rectum secondarily, as evidenced by the fact that these tapioca-like projections could be seen in the proctoscopy, and that it could be felt by digital examination and was not ulcerative A primary lesion in that region should be ulcerated by the time it reaches this stage and give blood in the stools This man had negative stools, so I think we can assume that the implants in the rectum were secondary and not primary The stomach being negative in the x-ray but nevertheless giving on aspiration large

amounts of cloudy fluid with a fecal odor makes one feel that possibly there might be a lesion in the stomach that the x-ray men had not seen We always hesitate to question their opinion because they are very accurate about their diagnoses

The story is consistent with a stomach lesion, however, and the fact that he was relieved for a while with baking soda and various things suggests the possibility of an ulcerative lesion of the stomach that might later have become malignant The laboratory data do not state whether he had any acid in his stomach That would be somewhat helpful because if he had acid I think we could feel a little more certain that this was not carcinoma of the stomach The fecal odor suggests the possibility of a spontaneous communication between the stomach and the colon Gastrocolic fistula does occur in carcinoma of the stomach and in carcinoma of the transverse colon We have had four instances of that in the last 10 years I am familiar with these figures because I have been interested in gastroduodenocolic fistula following gastroduodenostomy This man does not have a spontaneous fistula because if he did he would have had diarrhea and not constipation, and it would be a very easy lesion to pick up by the barium enema if the barium meal failed to show the fistula The colon is probably not the site of the primary disease, because nearly always you can be certain of a lesion of this size One that represents a palpable mass can be demonstrated by barium enema under the fluoroscope I have known one exception in the transverse colon where the barium enema was entirely negative and the entire transverse colon was involved with carcinoma

The small bowel has not been mentioned in the x-ray and apparently it did not make much impression on the roentgenologist when he went over it in the first place But this tumor could be in the small bowel, a lymphomatous condition with pelvic metastases forming a movable mass in this region We recently had such a patient with lymphoma involving the jejunum primarily as nearly as we could make out and later involving the descending colon, a mass that was as large as this one that is described It could be moved and that patient also had pelvic metastases that could be felt by rectum After the jejunal lesion and the sigmoid lesion were resected he was treated by x-ray and all his lymphoma has disappeared for the time being

DR HAMPTON I meant to mention the overfilling of the first and second portions of the duodenum and here you can interpret this defect as due to pressure from the spine and from a mass in front This reduction in size of the stomach is possibly due to spasm or due to an extrinsic process, since we do not see it inside I cannot say it is tumor of the pancreas but I

can say that it is consistent with it. I cannot see the tumor. There is no mass in the loop.

DR ALLEN. A tumor of the pancreas would explain very adequately his backache and the gastric symptoms.

The probabilities are that this was not the spleen because it did not go clear back into the flank. The mass is very accurately defined from the costal margin to the umbilicus and from the anterior axillary line to the midline and does not go to the flank. Also, we can rule out hypernephroma to explain the mass on the basis that there was absolutely no blood in the urine at any time and also because the mass did not extend into the flank.

This case might, I suppose, be accounted for on the basis of tuberculosis. We have had at least one patient in this hospital with tuberculous mesenteric glands that produced a large mass, in this instance it was a young woman and the mass was thought by some of the men to be an ovarian cyst as it could be pushed into the pelvis and moved out of the pelvis. It was a mass in the mesentery of the ileum that was sufficiently large to require resection of about three feet of the ileum in order to get rid of the tumor. This man is rather old to have symptoms from calcified mesenteric glands.

I would put down as my first choice for diagnosis carcinoma of the pancreas with metastases to the pelvis, and, secondly, I should put lymphoma with rather generalized involvement of the retroperitoneal area as well as the peritoneal cavity. It probably is not a carcinoma of the stomach. I believe that if it were carcinoma of the stomach as extensive as this the stomach would be in a different location and look differently in the x-ray, also I doubt if the mass would be quite so easily palpable if it were carcinoma of the stomach.

#### CLINICAL DISCUSSION

DR. CHESTER M. JONES. This patient was on the ward when I came on service and one of the most striking things was that he presented the symptoms of gastrointestinal obstruction. All of us felt that he had malignancy. It was a question of whether we were justified in advising exploration. The rectal mass was definite. The proctoscopy was the most curious one I have ever seen. It looked as if the entire wall were studded with soft tapioca. It did not bleed at all. I have never seen anything like it before. I raised the question whether it might be lymphomatous rather than metastatic malignancy from the gastrointestinal tract or the pancreas, but I think as we watched the patient's progress on the ward we felt that carcinoma of the pancreas was the most likely probability with pressure on the small bowel and almost complete obstruction before he died. The picture was one of intestinal obstruction. We all felt that ex-

ploration would serve merely to satisfy our curiosity and nothing else, and it was not done.

DR. TALBOTT. I saw this man the last few days before I went off service and at that time he presented quite a different picture than when Dr. Jones saw him. The picture was that of something outside the stomach. He did not give a history that made us think he had a lesion in the stomach. The only argument on the service was whether it was carcinoma of the pancreas or lymphoma. The masses were all fixed except the few nodules in the subcutaneous wall. The mass in the pouch of Douglas was a hard firm mass which gave the feeling of something from the outside pressing in, rather than something in the rectum. Dr. Eugene Sullivan thought it was carcinoma of the pancreas. I thought it was lymphoma.

#### CLINICAL DIAGNOSES

Carcinomatosis, source, probably the body or the tail of the pancreas.

Lymphoblastoma, retroperitoneal.

DR. ARTHUR W. ALLEN'S DIAGNOSIS

Carcinoma of the pancreas with metastasis to the pelvis.

#### ANATOMIC DIAGNOSES

Adenocarcinoma of the pancreas with extension to the stomach and duodenum and with metastases to the liver, visceral and parietal peritoneum, intestine, left adrenal and pericardium.

Pulmonary tuberculosis, healed.

#### PATHOLOGIC DISCUSSION

DR. BENJAMIN CASTLEMAN. The autopsy on this man showed that his abdominal cavity contained about 400 cubic centimeters of clear straw-colored fluid. The omentum and both the visceral and parietal layers of peritoneum were studded with large numbers of metastatic tumor nodules measuring up to a centimeter in diameter. Several were present on the undersurface of the diaphragm and the pelvis was filled with loops of small intestine adherent to each other and to the sigmoid and rectum by tumor tissue. There was, however, no ulceration into the bowel. In the region of the stomach, transverse colon and third portion of the duodenum was this huge fixed mass about 12 by 12 by 18 centimeters, that compressed the third portion of the duodenum and produced a dilatation of the first and second portions. It was pretty hard to separate the colon and duodenum from the body of the pancreas but it was finally done by blunt dissection. The tumor was primary in the body of the pancreas and involved all but the distal 3 centimeters of the tail. There were huge metastases

terially He became progressively weaker and died on the eighteenth hospital day

#### X-RAY INTERPRETATION

DR AUBREY O HAMPTON Here is the stomach and I have to accept the report that all it showed was thickening of the mucosa The mucosa is definitely thickened and the stomach seems small and short, and it empties rapidly It changes in shape I do not think it is rigid Here is a film of the gas filled stomach It is larger there (Indicating)

The kidney outlines in the intravenous pyelogram showed nothing I do not see the mass in the pelvis or any mass in the upper abdomen We did not have a film of the colon with complete filling This is a post evacuation film only The rectum is in normal position I do not see anything there In all these films the abdomen looks dense, rather homogeneous, large and distended The spine shows very little I should say there are only moderately advanced hypertrophic changes instead of marked ones The film of the esophagus and the lateral view of the chest are normal His chest shows fairly definite evidence of pulmonary fibrosis and enlargement of the glands He was an asbestos worker so probably it is asbestosis Some of these deposits seem to be in the costal cartilages instead of the glands In the lateral view, however, there are several quite definitely calcified glands, and this does not occur with asbestosis generally This is not an advanced case I can only say that the findings are consistent with asbestosis

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the septum between the middle and upper lobes. There was also a sharply defined mass projecting from the right upper mediastinum. X-rays of the spine and femora showed no evidence of metastasis and an intravenous pyelogram was negative.

Another white cell count was 14,700, 54 per cent polymorphonuclears, 20 band forms, 17 myelocytes, 3 myeloblasts, 3 lymphocytes, 1 eosinophil and 2 normoblasts. The patient continued to run a febrile course and still complained of severe pain in the right upper abdomen and back. There was also exquisite tenderness of the spinous processes of the lower dorsal and lumbar vertebrae. There was no further hemoptysis, but the patient became progressively weaker and died on the thirty-eighth hospital day.

#### X-RAY INTERPRETATION

DR AUBREY O HAMPTON This is the first examination. The mass described at the right lung root fades off gradually and the trachea is slightly displaced to the left. The diaphragm is normal. There is no evidence of collapse of the lung on either side.

Here is the final film. This mass at the right lung root has increased in size and now involves the pleura, and the mass in the upper mediastinum has also enlarged. Here is the interlobar septum at about normal level. There is still no collapse of the lung. In this lateral view the mass lies anteriorly and extends into the upper lobe around the trachea.

These are the films of the gastrointestinal tract. The antrum of the stomach is contracted in these two films. I can see only what is already given in the report, that is spasm of the antrum of the stomach. The antrum is not filled. You cannot say that no intrinsic disease exists from that examination. Here in this film, however, it looks as if there were no intrinsic disease. The gallbladder is as described. I do not see any shadow at all. The spasm of the antrum probably due to extrinsic disease, and failure of function of the gallbladder, are all that I visualize.

#### DIFFERENTIAL DIAGNOSIS

DR MYLES P BAKER To summarize this is a fairly rapidly fatal illness. A man of 53 develops out of the clear a paroxysmal right upper quadrant pain, possibly associated with change of position, such as forward bending, but noticeably unaffected by eating and not associated with gastrointestinal upsets of any form. There were nonspecific warnings that this process might be producing anemia of low grade and fever, but he worked until approximately seven weeks before his death in what I take to be a pronounced cachexia. Three weeks before entry the pain became a more

insistent ache. There may have been jaundice at this time. The pain radiated through or up to both shoulders.

Physical examination revealed little except right upper quadrant tenderness and fever, with a slightly elevated leucocyte count. He was not icteric. Nothing was found to implicate the heart in the symptomatology and no hard prostate was felt, as with a malignant process.

During his first week in the hospital he continued to run a fever. This first x-ray revealed an enlarged hilum shadow on the right. There was evidence of possible chronic cholecystitis without stone demonstrable by x-ray. The significance of this enlarged hilum shadow remained in doubt.

They mention that the diastase index was normal. Dr Crone tells me that the test has been done on several patients in the house in whom pancreatic disease was suspected, but it is of no value because you can have extensive pancreatic disease and get normal results from the test.

At the beginning of his second week he mentioned this right-sided chest pain with blood-streaked sputum and it was following that that the second x-ray revealed a rather rapidly enlarging mass in the right hilum. At this time he had developed an anemia out of proportion to the small amount of blood in his sputum. There was at this time evident myelocytosis, with an elevated serum phosphatase, a sign that the man had a rather marked osteoplastic process in his bones. This figure of 35 Bodansky units is in keeping with a metastatic malignancy involving bone. He remained subicteric and was, I take it, a problem in diagnosis on the ward. Two weeks later there is the note of a definitely enlarged liver and for the first time mention of a tender mass in the left upper quadrant. With this lead a pyelogram was done which revealed no kidney tumor. There was no evidence by x-ray of bone metastases. By x-ray there were signs of an extending process in the right lung field and hilum. Bronchoscopy, however, was negative. The fever, severe pain in his back, particularly in his later days, continued and death followed.

This man, it seems to me, certainly had either a bronchiogenic neoplasm, the first symptoms of which were due to retroperitoneal metastases, to lymph nodes in that region, or a growth originating in the retroperitoneal tissues, the pancreas or lymph nodes, with metastases to the mediastinal glands. The gastrointestinal tract is apparently intact by x-rays. The same arguments that Dr Allen advanced hold true here.

For special comment I would like to mention first the character of this man's pain. I was interested to find that in discussions of series of cases of cancer of the body of the pancreas that paroxysmal pain was spoken of as not in-

in the liver and left adrenal as well as a smaller one, 2 by 1 by 3 centimeters, on the visceral pericardium. Microscopically the tumor is a fairly well differentiated adenocarcinoma. His lungs showed no evidence of asbestosis, but they did contain patches of bronchopneumonia. The smaller pulmonary arteries contained a few small adherent thrombi. There were no metastases to the bones.

## CASE 22482

### PRESENTATION OF CASE

A 53 year old Finnish engineer was admitted complaining of pain in the right upper quadrant.

About one year ago the patient began to have attacks of pain in the right upper abdomen. These attacks persisted for about five minutes and the pain frequently radiated around and through to the right subscapular region. There was no nausea, vomiting, fever, relation to meals or associated change in bowel habits. There was no known precipitating cause except that bending forward occasionally initiated the pain. Four months before entry some shortness of breath with exertion was noted and there was slight increase in perspiration although he had no night sweats. Three weeks before coming to the hospital he had an attack of pain similar in severity to the others but persisting up to entry. He continued to work for a few days but finally was compelled to go to bed. A physician was called and hospitalization was advised. At this time the patient was informed that his sclerae were icteric. He went to a hospital for several days but left against advice. He remained at home in bed and the pain persisted with varying severity. For 2 weeks there was pain in both shoulders.

Physical examination showed a well-developed and moderately obese man with shallow, irregular, rapid breathing accompanied by coarse grunts. The skin was dry and there was questionable jaundice of the sclerae. The chest was barrel shaped but the lungs were clear. The heart was not enlarged. The sounds were of fair quality. A systolic murmur was audible over the precordium. The blood pressure was 130/85. The abdomen was distended and tympanic. There were spasm and deep seated tenderness in the right upper quadrant. Rectal examination was negative.

The temperature was 100.2°, the pulse 90. The respirations were 24.

Examination of the urine was negative. The blood showed a red cell count of 4,700,000, with a hemoglobin of 95 per cent. The white cell count was 11,200, 77 per cent polymorphonuclears. Stool examinations were negative. The diastase index was normal. The nonprotein nitrogen was 26 milligrams and an icterus index

was 5. A Hinton test was negative and an electrocardiogram was negative.

X-ray examination of the chest showed the heart to be normal in size and shape and the aorta to be slightly tortuous. Both hilar shadows were unusually large, particularly on the right side. The lung fields were clear. A Graham test showed no definite shadow of the gallbladder although several very faint suggestive areas were noted. The dye was seen in the colon. A gastrointestinal series showed no evidence of organic disease of the esophagus, stomach, or duodenum.

The patient's temperature fluctuated between 100° and 102°, his pulse between 90 and 110, and the pain was unabated. On the eighth hospital day he complained of pain in the right lower chest upon deep inspiration. At this time he coughed up about an ounce of blood streaked sputum. Examination of the chest showed no dulness but a few fine râles were audible at the left base.

Another chest x-ray showed normal position and movement of the diaphragm and clear lung fields. There was a large mass in the right hilus with hazy density extending up along the right superior mediastinum. The mass was also seen in the lateral view and the trachea appeared to be slightly displaced to the left.

A red blood cell count at this time was 3,050,000, with a hemoglobin of 55 per cent. The white cell count was 14,300 and the smear contained 21 per cent band neutrophils, 39 segmented forms, 14 lymphocytes, 3 monocytes and 23 myelocytes. An icterus index was 9 and the van den Bergh 15 to 2 milligrams. A gastric analysis showed a free acid of 6 after ergamine and a total acid of 12. A serum phosphatase was 35 Bodansky units.

Another examination on the twenty-fifth hospital day showed a slight labial cyanosis. The right chest was dull to flat from the third to ninth interspace posteriorly and dull anteriorly from the third interspace down. Many expiratory wheezes were audible generally and breath sounds were diminished on the right side although the expiratory phase appeared to be prolonged. Fine moist râles were heard at both bases. The liver extended down about a hand breadth beneath the costal margin. Its edge was rounded and said to be smooth and non-tender, although other examiners stated that it was hard, nodular and somewhat tender. The spleen was not felt, but deep in the left upper quadrant there was a tender indefinite mass which appeared to descend with respiration. There was tenderness in the left costovertebral angle.

A bronchoscopic examination was entirely negative but another chest x-ray showed increase in the size of the mass in the right hilus. There was now hazy dulness extending through the midportion of the right lung field just above

hyperplasia that is not uncommon in severe bone marrow replacement. The primary source of the cancer was in the head of the pancreas which was replaced by a firm irregular mass 8 by 7 by 6 centimeters which did not involve much of the body of the pancreas. Although metastatic glands surrounded the bile ducts they did not compress them sufficiently to produce obstruction and jaundice.

The liver and kidneys contained numerous metastatic nodules and both adrenals were almost completely replaced by tumor. The pleural surfaces of the lungs were studded with small metastases and there were also a few that involved the parenchyma. In the floor of the right middle fossa of the skull were two small tumor nodules. The most interesting metastases were those to the bronchial lymph nodes which produced a mass 7 by 5 by 4 centimeters that deflected the right bronchus superiorly and anteriorly and extended along the right posterior aspect of the trachea. There was however no perforation or significant obstruction of the bronchus, the latter accounting for the absence of lobal collapse on the x-ray film a fact which helped Dr. Baker to eliminate a primary bronchiogenic tumor.

A few years ago we presented here a similar case in which the mediastinal metastases were so large that a diagnosis of mediastinal lymphoma was made clinically. Because of these two cases we thought it might be interesting to review all the autopsied cases of carcinoma of the pancreas during the past 36 years for distribution of metastases and other significant data.

We have had during this period 91 cases and it is noteworthy that of the 84 in which the

clinical diagnosis is recorded the correct diagnosis was made antemortem in only 42, exactly 50 per cent. A palpable mass was noted in only 36 per cent of the cases. The likelihood of a correct diagnosis is obviously greatly influenced by the presence or absence of jaundice and this in turn is apt to depend upon the exact anatomic location of the tumor, tumors of the head being naturally frequently associated with jaundice and tumors of the body and tail rarely so. That a significant number of exceptions to this rule occur is shown however, by the fact that of 69 cases with involvement of the head of the organ 5 were free from any trace of jaundice whereas, of 21 cases where body or tail were involved without the head, jaundice was present in 4. Among these 21 cases of cancer of the body or tail the correct diagnosis was made antemortem only twice.

That painless jaundice is not the rule in cancer of the pancreas was also clearly brought out. Pain was complained of in 70 per cent of the cases and pain in or radiating to the back was specifically mentioned in 25 per cent. In the small group of cases of the body and tail back pain seemed proportionally a little more frequent, 33 per cent to be exact. The distribution of metastases is shown in the following table.

DISTRIBUTION OF METASTASES  
(Present in two-thirds of the cases)

Liver	47	Gallbladder	5
Lymph Node	42	Kidney	4
Peritoneum	15	Colon	3
Lung	15	Pleura	3
Adrenal	9	Heart	3
Medastinum	6	Bone	2
Brain Uterus Ovary Stomach and Thyroid	1		

frequently occurring. The French authors, such as Chauffard, are quoted as emphasizing the atrocious character of this paroxysmal pain, unaffected by eating, without nausea and vomiting and mimicking tabetic crises. Whether this man had such fierce pain as that we do not know, at least, it was paroxysmal. I had not been aware that cancer of the pancreas led to such pain. It has been attributed to intimate relation between the body of the pancreas and the solar plexus. In about thirty cases of cancer of the pancreas which Kiefer reported three or four years ago four or five had this paroxysmal pain, later, as the course of the disease goes on, turning into an insistent boring pain, often in the right upper quadrant and therefore giving hope that one is dealing with gallbladder disease. The relief this man secured by standing up is said to be characteristic of retroperitoneal disease of this type. Some victims of cancer of the pancreas have been described as being only comfortable in the position of a Moslem at prayer toward Mecca. Others have this intractable sort of pain when lying down and are relieved when standing up. This is a nonspecific symptom, of course, and may be due to retroperitoneal lymphoma as well as to cancer of the pancreas.

Is it a possibility that we are dealing here with bronchiogenic carcinoma with retroperitoneal metastases? There have been cases discussed here in which the relatively small malignant growth at the hilum has really made itself manifest with metastases to the liver, giving the picture of liver failure with jaundice and bringing up the differential diagnosis between carcinoma of the bile duct with metastases to the mediastinum, and bronchiogenic carcinoma with liver metastases. I think the rapid progress of this man's lesion in the hilar region, with its rapid growth out into the lung, would be rather more in favor of metastases from a retroperitoneal source rather than the manifestation of extension from a primary growth in the bronchus, and bronchoscopy revealed no growth.

Is it possible that we are dealing with lymphoma? Before this last case was presented I was about to say that—barring one case that I saw last winter—the absence of gastrointestinal symptoms was rather against it and more in favor of cancer of the pancreas but here in the last case we have cancer of the pancreas with marked nausea and vomiting and duodenal obstruction. The instances of retroperitoneal lymphoma without enlargement of the peripheral lymph nodes that I have seen have happened to have more pain in the legs, perhaps edema of one leg and a mass that may be felt in the right lower quadrant as well as in the left upper quadrant more signs of a diffuse process than this man showed.

How should we explain the blood picture? It seems to me more likely that this is a myelocytosis as the result of metastatic disease involving the bone marrow than that we are dealing with the most unlikely possibility of an aleukemic leukemia in this case, without the usual splenomegaly, or thrombopenic purpura.

We have had here in some of these cases for discussion a precedent for attributing left sided backache such as this man had toward the end of his hospital stay to cancer of the pancreas. There have been cases in which there has been marked metastatic involvement of the mediastinal lymph nodes. Other cases of cancer of the body of the pancreas have not emphasized metastases to bone. Yet I am inclined to make cancer of the pancreas with metastases to the mediastinal lymph nodes and with metastasis also to bone not demonstrated by x-ray the first choice in this case, and to consider lymphoma as the second possibility and less likely.

#### CLINICAL DISCUSSION

DR CHESTER M. JONES: The picture was that of metastatic malignancy. When he was on the service the question of course arose as to the source. I think that as we watched the case we felt a little more inclined to think it was primary in the lung than elsewhere in the body, but that is as far as we got toward making a flat diagnosis.

#### CLINICAL DIAGNOSES

Carcinomatosis, ? source  
Myelophthisic anemia

#### DR MILES P. BAKER'S DIAGNOSIS

Carcinoma of (body of) pancreas with metastases to the right hilum and to the bone marrow

#### ANATOMIC DIAGNOSES

Carcinoma of the head of the pancreas with metastases to regional lymph nodes, retroperitoneal and mediastinal glands, liver, lungs, kidneys, adrenals, vertebrae and skull

(Myelophthisic anemia)  
Parathyroid hyperplasia, slight

#### PATHOLOGIC DISCUSSION

DR BENJAMIN CASTLEMAN: This man had a vertebral spine that was almost completely replaced by carcinoma. The only spots that are not cancerous are these isolated red spaces that you see here. The remainder, the white areas, are all cancer. The extremely diffuse involvement of the spine plus its osteosclerotic nature probably account for the lack of visualization on the x-ray film, for the pseudoleukemic blood findings, and also for the slight parathyroid



hyperplasia that is not uncommon in severe bone marrow replacement. The primary source of the cancer was in the head of the pancreas which was replaced by a firm irregular mass 8 by 7 by 6 centimeters which did not involve much of the body of the pancreas. Although metastatic glands surrounded the bile ducts they did not compress them sufficiently to produce obstruction and jaundice.

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## HOME NURSING

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there to nurse the sick? Have they not been brought up in homes? Well, perhaps not according to some descriptions of contemporary life.

In substance the charge is that the nurse trained in the hospital becomes institutionalized. But nurses are not the only persons in the community suffering from this condition. The complaint is indeed general and as to the nurse is justified if it is re-worded to read "Too many nurses become institutionalized."

The solution of this problem lies at a deeper level than is generally reached in attempted analyses of the nursing situation. It is but a superficial explanation to say that the nurse in the hospital is too busy to learn the elaborate details which characterize the nursing by the finished artist. The specific defect in nurses, and in others in many walks in life is that the mind becomes rigid; there is lost the capacity for adaptation to changed circumstances.

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There is another reason why home nursing has remained in less favor with the nurse, in comparison with the "district and public health nursing." It is social too often the nurse is regarded not merely as a domestic servant, in some communities this implies no degradation, but as a menial, in the contemptible sense.

There is another point often overlooked in making comparisons, namely, that the district nurse, in Boston formerly working under the Instructive District Nurses Association, not only nurses patients in their homes but also has an important function in instructing the family in the care of the patient.

The problem of adequate nursing in the home is a real problem, urgent and of signal magnitude, but its solution would seem to be not in creating new institutions but by improving and extending institutions already in existence. Some District Nursing Associations actually give to graduate nurses and to undergraduate nurses the training desired under adequate supervision. It is more fundamental, however, that the hospital school of nursing assist the pupil nurse in the truly educational work of postponing as long as possible the inevitable rigidity of the mind common enough in old age, but characteristic of the institutionalized person, irrespective of years.

## THE REPORT OF THE MASSACHUSETTS BOARD OF REGISTRATION IN MEDICINE

THE report of the Massachusetts Board of Registration in Medicine for 1935 is at hand and is an interesting document because of the factual data contained therein and certain recommendations submitted.

The facts set forth substantiate the arguments, submitted to the legislature of 1936, respecting the large number of applicants who were inadequately prepared to enter upon the practice of medicine, as shown by 117 rejections of 159 examined in March, 138 of 216 in July, and 159 of 230 in November an average percentage of rejections of over 70, or a total of 414 rejections of 609 applicants.

There were three special examinations of one applicant in each, probably to enable certain well-qualified applicants to engage in some essential field of practice in the state.

In addition to those registered by examination, 71 others were enrolled as legally qualified through certification by the National Board. This authority was conferred by the legislature in 1923 and is now the custom in forty-three states.

The records give the results of the examinations of the graduates of all medical schools from which the applicants came and show to some extent the quality of instruction carried on by the several institutions. A significant question may be, Have those medical schools represented by the larger groups of rejected applicants shown good judgment in accepting students who are not naturally adapted to, or educationally qualified for, the study of medicine? Fortunately for many would-be doctors, the better equipped medical schools do not feel warranted in encouraging the wasted time devoted to medical study by those whose lives should be spent in other pursuits. Now that the Massachusetts law has conferred upon a board authority to determine the educational standards of medical schools and to decline to accept applicants from nonapproved schools there will be fewer rejections after 1939 when this law shall have become operative.

There is a very important fact set forth in the report which is that the work of the Board is a source of state revenue for, since its creation it has earned for the Commonwealth \$66,561.46 in excess of the costs of operation.

Since this is a public health measure designed to provide therapeutic and preventive service, it is regrettable that the earnings of the Board are not more generally available for the protection of the people against the practice of irregulars.

Under the financial system of the Commonwealth, the earnings of the Board of Registra-

tion in Medicine are not at the command of the Board, but are deposited with the Treasurer, and the expenses of the Board are defined in budgeting appropriations which have never been adequate for the needs of this department.

The Board believes that a careful census of the physicians of the state should be made at regular intervals in order to detect impostors. This custom prevails in many states with the possible result that irregular practitioners may migrate to other less vigilant sections of the country. A request for an appropriation for this study has been submitted to the legislature, but did not meet with the general approval of the medical profession and the appeal was denied. With the appropriation of a suitable sum from the earnings of the Board this investigation could be undertaken without making a direct tax on the physicians and seems to be desirable. Since power has been given in 1936 to a commission to determine the standing of medical schools, and other steps designed to promote the quality of medical service are worthy of approval.

We urge careful study of existing conditions and the conferring of such added powers as may enable the Board of Registration in Medicine to serve the Commonwealth adequately.

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

MYERSON, ABRAHAM M.D. Tufts College Medical School 1908 Professor of Neurology, Tufts College Medical School Clinical Professor of Psychiatry, Harvard University Medical School Visiting Physician, Department of Nervous Diseases Boston City and Beth Israel Hospitals Division of Research Boston State Hospital Address 475 Commonwealth Avenue Boston Mass. Associated with him are

RINKEL, MAX M.D. University of Kiel (Germany) Medical School 1926 Formerly, Chief Assistant Physician Psychiatric and Neurological Clinic of the Medical Academy, Düsseldorf, Germany. Now Research Associate Boston State Hospital Address Boston State Hospital Dorchester Center Mass. And

DAMESHEK WILLIAM M.D. Harvard University Medical School 1923 Associate Physician Beth Israel Hospital Assistant Professor of Medicine, Tufts College Medical School Research Associate Boston State Hospital Address 371 Commonwealth Avenue, Boston Mass. Their subject is "The Autonomic Pharmacology of the Gastric Juices" Page 1005

THORNDIKE, AUGUSTUS, JR. M.D. Harvard University Medical School 1921 F.A.C.S. Associate Surgeon, The Children's Hospital, Bos-

# The New England Journal of Medicine

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THE BOSTON MEDICAL AND SURGICAL JOURNAL  
Established in 1828

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under the jurisdiction of the

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luncheon and, instead, the medal was presented to Major General Walter L. Reed, son of Major and Mrs. Reed now inspector general of the army.

At the same time a similar Walter Reed medal was presented to the Rockefeller Foundation, which has aided in the work of eradicating yellow fever in many parts of the world by applying the discovery of Major Reed. It was received by Raymond B. Fosdick, president of the foundation, for present workers in yellow fever eradication and those who have died in the work.—*Boston Herald*, November 20

#### HEALTH OFFICERS MONTHLY STATEMENT OF VENEREAL DISEASES REPORTED IN THE NEW ENGLAND STATES

SEPTEMBER, 1936

This statement is issued monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The following reports were received from State Health Officers. The figures are preliminary and subject to correction. It is hoped that this will stimulate more complete reporting of these diseases.

State	Syphilis		Gonorrhea	
	Cases Reported During Month	Monthly Case Rates per 10,000 Population	Cases Reported During Month	Monthly Case Rates per 10,000 Population
Connecticut	198	1.15	123	.72
Maine	44	.52	58	.69
Massachusetts	463	1.06	571	1.31
New Hampshire	14	.28	7	.14
Rhode Island	98	1.44	65	.95
Vermont	33	.88	32	.85

Treasury Department—U. S. Public Health Service

### CORRESPONDENCE

#### PREVENTIVE MEDICINE AND CURATIVE MEDICINE

Editor, *New England Journal of Medicine*,

With the extension of preventive medicine as organized by the various health departments, federal, state or local, with the taxpayers' money, it is important for both laymen and physicians to realize the difference between preventive medicine and curative medicine.

At the present time a part of curative medicine such as the treatment of mental disease, tuberculosis and cancer is paid for by the taxpayers' money and that part of it is not always available to all the citizens.

On the other hand, preventive medicine which is paid for by the taxpayers' money at the present time is available to practically all the citizens, rich or poor, if they choose to avail themselves of the opportunity.

Recently there has been a reasonable amount of complaint on the part of practitioners that abuse of charity exists in curative medicine and that encroachment is also made by preventive medicine upon the practice of physicians. These two complaints should be kept separate by the practitioners.

Attempts have been made by the District Societies of the Massachusetts Medical Society located in the City of Boston to eliminate so far as possible the abuse of charity in the treatment of disease in the large clinics. Although theoretical safeguards against this abuse have been established in all the clinics, there is probably still an appreciable amount of abuse which it is hoped as time goes on will be further eliminated.

These same District Societies have also studied the question of the encroachment of preventive medicine upon the work of the practitioners with the object of eliminating this encroachment if it seems justifiable. It must be realized that much of this preventive medicine is educational work and the people are slow to pay directly for something about the value of which they are uncertain. Therefore, this work must not be handicapped by the objection of expense. Also it must be remembered that all the citizens are entitled to these preventive medicine procedures paid for by taxes according to the present view of those in authority. In order to keep some of this work such as immunization and health examination in the hands of the practitioners, it is necessary to establish the fact that it is better for the patients to have this work done by their family physician. In this regard it is interesting to find that the Health Department of Boston through its Health Commissioner, Dr. William B. Keeler, and the Deputy Commissioner, Dr. Charles F. Wilinsky, instruct their nurses to make every possible effort to have the public use their family physicians for immunization work and the work done by the Well Baby Clinics, and to refer to the Health Department Clinics in Boston only such people as are unable to employ a family physician or do not seem inclined to do so. The health authorities instruct their nurses that it is better for the individuals to have this work done by their family physicians. It is to be hoped that the nurses of the Public School Association will be instructed as clearly in this regard as are the Public Health Nurses.

The writer of this article has recently had the opportunity to be present at a meeting at which the nurses of the Health Department of the City of Boston were instructed along these lines and was also given an opportunity to present the practitioners' point of view and he is convinced that the Health Officers of the City of Boston sincerely hope that individuals will have this work done by their family physicians. The writer took the opportunity to call the nurses' attention to the fact that some of the physicians in Boston are organizing a Public Health Hour or making special arrangements so that some of these preventive medicine procedures can be offered to their patients at a price commensurate with the patient's ability to pay even if at less than

ton Consulting Surgeon, Canton Hospital School Surgeon, Milton Hospital and Department of Hygiene, Harvard College Assistant in Surgery, Harvard University Medical School Address 319 Longwood Avenue, Boston, Mass Associated with him is

PIERCE, F RICHARD M D Harvard University Medical School 1934 Formerly, Intern Surgical Service, The Children's Hospital, Boston Now, Assistant Resident in Surgery, Henry Ford Hospital, Detroit, Mich Address Henry Ford Hospital, Detroit, Mich Their subject is "Fractures in the Newborn A Plea for Adequate Treatment" Page 1013

STEINBERG, NAAMAN M D Tufts College Medical School 1919 Proctologist, Beth Israel Hospital, Boston, Mass His subject is "Recent Advances in the Treatment of Rectal Diseases by Injection Methods in Ambulatory Patients II Pruritus Ani" Page 1019 Address 311 Commonwealth Avenue, Boston, Mass

WILLIAMS, JOHN T M D Harvard University Medical School 1904 F.A.C.S Instructor in Gynecology, Harvard University Medical School Surgeon-in-Chief for Gynecology and Obstetrics, Boston City Hospital Obstetrician-in-Chief, Whidden Memorial Hospital, Everett, Chelsea Memorial Hospital, and Winthrop Community Hospital His subject is "Epidemic Puerperal Sepsis" Page 1022 Address 429 Beacon Street, Boston, Mass

WORCESTER, ALFRED A M, Sc D, M D Harvard University Medical School 1883 Henry K Oliver Professor of Hygiene Emeritus, Harvard University His subject is "Home Nursing" Page 1027 Address 314 Bacon Street, Waltham, Mass

### The Massachusetts Medical Society

#### FOURTH ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning November 30

##### Bristol North

Thursday, December 3, at 4 00 p m, at the Morton Hospital, Taunton Subject *Complications of Diabetes and Their Treatment* Coma, Insulin Reactions Surgery (Gangrene, Carbuncle Etc) Marriage and Pregnancy Tuberculosis and Heart Disease Instructor E P Joslin Arthur R Cran dell, Chairman

##### Bristol South (Fall River Section)

Monday, November 30, at 4 00 p m at the Stevens Clinic of the Union Hospital Fall River Subject *Complications of Diabetes and Their Treatment* Coma Insulin Reactions Surgery (Gangrene, Carbuncle, Etc)

Marriage and Pregnancy, Tuberculosis and Heart Disease Instructor Alexander Marble Howard P Sawyer Co-Chairman

##### Bristol South (New Bedford Section)

Friday, December 4, at 4 00 p m, at St Luke's Hospital, New Bedford Subject *Complications of Diabetes and Their Treatment* Coma Insulin Reactions, Surgery (Gangrene Carbuncle, Etc), Marriage and Pregnancy Tuberculosis and Heart Disease Instructor H F Root Robert H Goodwin, Co-Chairman

##### Middlesex North

Friday, December 4, at 7 00 p m, at St Joseph's Hospital, Merrimack Street, Lowell Subject *Blood Diseases The Hemoglobin and Red Blood Cells in Relation to Disease* Instructor W P Murphy Samuel A. Dibbins, Chairman

##### Middlesex South

Tuesday, December 1, at 4 00 p m, at the Cambridge Municipal Hospital, Cambridge Subject *Acute Abdominal Emergencies* Instructor A W Allen Edmund H Robbins, Chairman.

##### Norfolk South

Monday, November 30, at 8 30 p m, at the Quincy City Hospital Subject *Psychiatry* (a) Psychobiology in General Medicine (b) The Common Neuroses Instructor H C Solomon David L Belding, Chairman

##### Plymouth

Tuesday, December 1, at 4 00 p m, at the Brockton Hospital, Brockton Subject *Blood Diseases The Hemoglobin and Red Blood Cells in Relation to Disease* Instructor C W Heath W H Pulsifer, Chairman

##### Worcester North

Friday, December 4, at 4 30 p m, at the Burbank Hospital, Fitchburg Subject *Diabetes General Plan of Treatment in Uncomplicated Cases Diet, Insulin (Regular and Protamine) Exercise* Instructor E P Joslin Edward A. Adams, Chairman

### MISCELLANY

#### WALTER REED'S WIDOW HONORED

Amid a hushed and respectful audience the scientific epic of how Major Walter Reed of the U S army medical corps proved that yellow fever is transmitted by mosquitoes was retold recently The recitation of the 36 year old classic of medicine was provoked by the presentation to Mrs Walter Reed widow of the late army surgeon of the Walter Reed medal by the American Society of Tropical Medicine

Mrs Reed was unable to attend the society's

November 12 1936 the following officers were elected for the ensuing year

President—Fletcher H Colby M D Boston

Secretary—Treasury — George C Prather M D Boston

Executive Committee — Samuel N Vose M D  
Chairman Boston W O Wilder M D Springfield  
Mass. C Harold Jameson, M D Rockland, Me.  
John C Eckels, M D Lisbon N H, W G Townsend  
M.D., Burlington Vt Howard K Turner M D  
Providence R I, C H Neuswinger M D Waterbury  
Conn

### GREATER BOSTON MEDICAL SOCIETY

The next meeting of the Greater Boston Medical Society will be held on Tuesday December 1 at 8 30 p. m. at the Beth Israel Hospital Auditorium Boston

#### PROGRAM

Panel Discussion

Abdominal Pain in Infancy and Childhood

Chairman Hyman Green M D

Panel Doctors J Wallace G Rubin M H J  
Freedman M Ingall and G Kahn

H A KONTOFF M D, *President*

D B STEAKINS, M D *Secretary*

### HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheater (Shattuck Street Entrance), Tuesday evening December 8, at 8 15 p m

#### PROGRAM

Presentation of Cases

The Physiology of the Breast. By Edwin B Astwood M D The Johns Hopkins Hospital, Baltimore Maryland

Medical students and physicians are cordially invited to attend

MARSHALL N FULTON, M D *Secretary*

### THE BOSTON DISPENSARY

25 Bennet Street

#### CLINICAL STAFF MEETING

A luncheon meeting of the Clinical Staff of the Boston Dispensary will be held on Friday November 27 1936 in the Auditorium on the second floor of the Dispensary building at 12 o'clock noon

At 12 30 p m Dr Richard H Norton Chief of the Dental Department will speak on 'Correlation of Dentistry and Medicine'

An invitation is extended to any who are interested in the subject Luncheon to nonmembers 25 cents.

OLIVER G TINKHAM, M D *President*

LOUIS E WOLFSON, M D, *Secretary*

### BOSTON PATHOLOGICAL SOCIETY

The next meeting of the Boston Pathological Society will be held in the Amphitheater of the Children's Hospital (Entrance on Villa Street), Tuesday December 1, at 8 p m

#### PROGRAM

1 Chromosome Structure with Relation to Radiation Alfred Mirshuk Ph D

2 The Effect of Radiation on the Skin Shields Warren M D

Physicians and medical students are invited to attend The program will be followed by a business meeting of the Society

SIMON C DALYMEIER M D *Secretary*

### BOSTON UNIVERSITY MEDICAL SOCIETY

MEETING IN THE EVANS MEMORIAL AUDITORIUM

75 East Concord Street Boston

Monday Evening November 30 1936 at 8 o'clock

#### PROGRAM

Presentation of Case

Protamine Insulin and the Hæmoglobin Ery of Diabetes —Dr Elliott P Joslin Dr Priscilla White

Medical students nurses and physicians are cordially invited to attend

ROBERT E MOSS, *Secretary*

### FAULKNER HOSPITAL CLINICAL MEETING

The next meeting will be held on Thursday afternoon December 3 at 5 00 p m In addition to the usual clinical pathological conference Dr Arthur T Hertig will talk on 'Pathology of Abortion'

All physicians are invited

### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY NOVEMBER 30, 1936

Monday, November 30—

8 30 p m Robert Eckel Brigham Hospital Lecture on Arthritis

8 p m Boston University Medical Society Evans Memorial Auditorium 75 East Concord Street Boston

Tuesday, December 1—

1 30 a m Massachusetts General Hospital Thoracic Clinic Father Dome

8 30 p m Boston Pathological Society Amphitheater of the Children's Hospital (Entrance on Villa Street)

8 30 p m Greater Boston Medical Society Beth Israel Hospital Auditorium

Wednesday December 2—

New England Obstetrical and Gynecological Society University Club Boston

8 a m Massachusetts General Hospital Grand Rounds Orthopedic Department

11 2 m Clinico Pathological Conference Children's Hospital Amphitheater

4 p m - 5 p m Surgical Pathological Conference Dr Cutler and Dr Wolbach Peter Bent Brigham Hospital

Thursday December 3—

8 30 a m Massachusetts General Hospital Circulatory Clinic

8 30 - 1 30 a m Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and the Children's Hospitals held this week at the Children's Hospital

11 a m Massachusetts General Hospital Medical Grand Rounds

1 m Massachusetts General Hospital Clinical Pathological Conference

8 30 p m Medical Clinic Peter Bent Brigham Hospital Dr Henry A Christman

8 p m Faulkner Hospital Clinical Meeting

the usual fees. The writer feels that practitioners should make every effort to see that their examinations of apparently healthy patients are as thorough as those offered by the Health Department Clinics.

CHANNING FROTHINGHAM, M D

November 17, 1936

#### A VOTE PASSED BY THE BOSTON SOCIETY OF ANESTHETISTS

November 19, 1936

Editor, *New England Journal of Medicine*,

At a special meeting of the Boston Society of Anesthetists held November 6, the following vote was passed. This vote was taken, not only after full discussion with Doctors Faxon and Blaisdell, but also after a series of conferences with anesthetists from New York, Rochester, Washington, and other places held during the October Congress of Anesthetists at Philadelphia.

'Resolved that it is the sense of this society that the Hospital Prepayment Plan as at present drawn up would if the anesthetists should be included, tend to reduce them toward the position of technicians, would tend to place them under the control of the hospitals and would set them apart from other branches of medicine, that these influences would tend to stop progress in anesthesia and to push the practice of anesthesia back to its status of a few decades ago, and would ultimately result in poorer service to the patient and that for these reasons the society stands against being included in the contract as now proposed.'

Very truly yours

RUSSELL F. SHELDON, M D, *Secretary*

#### RECENT DEATHS

**HALLOWELL**—CLEMENT HOWARD HALLOWELL, M D, a retired physician of Billerica, Massachusetts, died at his home, November 13, 1936.

Dr. Hallowell was born in 1854, graduated from the Colby College, and from the medical school of Boston University in 1879. He formerly practiced in Norwood, Massachusetts, before moving to Billerica several years ago.

His widow, Mrs. Blanche G. Hallowell, and a daughter, Mrs. John Cochrane, of Billerica, survive him.

**MCNEISH**—ALEXANDER MCNEISH, M D, of Leicester, Massachusetts, died at his winter home at St. Petersburg, Florida, November 20, 1936. Dr. McNeish came to Massachusetts from Sussex, New Brunswick, and entered the Tufts College Medical School, graduating therefrom in 1896. He retired from membership in the Massachusetts Medical Society in 1934.

Dr. McNeish had served as Leicester school physician and as a member of the School Board. In addition he had taken active positions in other civic activities and was a member of the Congregational Church.

His widow, Mrs. Esther (White) McNeish, and a daughter, Miss Marion McNeish, survive him.

**WILBUR**—SARAH MANN WILBUR, M.D., of Springfield, Massachusetts, died at her home, November 20, 1936, after a practice of over forty years.

Dr. Wilbur was born in Westerly, R. I., in 1853, the daughter of Dr. William Hale Wilbur, and, after her graduation from Rutgers Female College, entered the Woman's Medical College of Pennsylvania, graduating therefrom in 1885. She had served at the New England Hospital for Women and Children, as resident physician at the Monson State Primary School, the Staten Island branch of the Nursery and Children's Hospital, and at the home for Friendless Women. In May 1888, she began practice in Springfield and devoted much of her work to obstetrics.

Dr. Wilbur was a member of the Springfield Women's Medical Society, a retired member of the Massachusetts and Rhode Island Medical Societies, and also of the American Medical Association.

Two nephews, John Wilbur, of New London, Connecticut, and William Hale Wilbur, of Hawaii, and a niece, Mrs. Edith Keller, of Newton Center, survive her.

#### NOTICES

##### MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p. m. on Thursday, December 3, in the Amphitheater of the Peter Bent Brigham Hospital, Dr. Henry A. Christian, Hersey Professor of the Theory and Practice of Physics, Harvard Medical School and Physician-in-Chief, Peter Bent Brigham Hospital, will give a medical clinic. To it are cordially invited practitioners and medical students.

##### LECTURE ON ARTHRITIS AT THE ROBERT BRECK BRIGHAM HOSPITAL

Dr. H. Warren Crowe, Director of the Rheumatism Clinic at Charterhouse, London, will be the guest speaker at a meeting on Monday, November 30, at 8 o'clock at the Robert B. Brigham Hospital.

Dr. Crowe will speak on the results of his work with vaccine in the treatment of arthritis over a period of twenty years.

Physicians and medical students are cordially invited.

##### APPOINTMENT OF DR. GODDU

Dr. Louis A. O. Goddu has recently been appointed Clinical Professor of Orthopedic Surgery at Tufts College Medical School.

#### REPORT AND NOTICES OF MEETINGS

##### OFFICERS OF THE NEW ENGLAND BRANCH OF THE AMERICAN UROLOGICAL ASSOCIATION

At a meeting of the New England Branch of the American Urological Association held in Boston, on



# The New England Journal of Medicine

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## THYROID ADENOMAS AND THEIR CLINICAL COMPLICATIONS, WITH ESPECIAL REFERENCE TO THE DISCRETE ADENOMA

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THE solitary, discrete or "fetal" adenoma of the thyroid gland is not really a goiter in the common sense of the term, since it is not the result of a hyperplastic or degenerative process in the thyroid gland. It should be looked upon as a tumor growing in an otherwise normal gland. The tendency is to include this type in the general term "goiter" and to decide on its management on the basis of any effect it may produce on thyroid function. It is a common experience to see an individual who has had repeated metabolism tests which were used as a basis of advice concerning treatment of the goiter. Only in rare instances does the metabolic rate properly enter into the decision regarding treatment of a discrete adenoma of the thyroid. Discrete adenomas all deserve careful consideration because of the complications which so often accompany them.

From the clinician's viewpoint, the commonest enlargement of the thyroid gland is the simple, diffuse, symmetrical colloid goiter that appears most often at puberty, pregnancy, or the menopause. This goiter is probably related to thyroid deficiency and is a so-called "work hypertrophy" of the gland. As this colloid goiter persists, degenerative changes may occur therein, with alterations in the blood supply and with formation of multiple nodules. These nodules are irregularly placed in the thyroid and are the result of degenerative processes, following the thyroid cycle of hyperplasia in evolution and rest. They are not in the nature of new growths, either clinically or histologically, and probably are in no way related to the origin of cancer in the thyroid gland. Not infrequently, however, these multiple nodular or adenomatous goiters cause symptoms from their effect on the metabolism or from pressure on nearby structures.

It has been shown that the thyroid adenoma inclines in its structure toward the normal thyroid gland. Due to its repetition of the different developmental stages of the normal gland, plus the occurrence of intracapsular regressive changes, the thyroid adenoma is marked by both

macroscopic and microscopic multiformity of structure. This has led to many classifications of thyroid adenomas dating from Virchow's early differentiation (1880) on the basis of gross appearance into the soft glandular goiter, the fibrous goiter and the vascular goiter.

Adenomas in general—and it is the solitary, discrete adenoma that concerns us chiefly here—may be classified as either (1) parenchymatous or (2) colloid in form. The parenchymatous adenoma is characterized by quantitative predominance of epithelial elements over the colloid secretion and stroma. It is this group that includes the immature called "fetal adenoma" so designated by Woelfler, quoted by Wegelin<sup>1</sup> who ascribed the term adenoma to only those tumors which, according to his opinion, developed from nests of embryonal, glandular epithelium. These parenchymatous "fetal" adenomas are composed of immature incompletely differentiated cells, often suggesting embryonic or fetal origin, and they are peculiarly liable to changes commonly associated with tumors having fetal tissue. Their histologic structure may show solid strands and cords of epithelial cells with or without some follicle formation. They do not yet have the characteristics of completely matured thyroid tissue, i.e., uniform well-developed follicular structure with generous colloid and abundant stroma. They occur in the form of discrete, solitary, encapsulated nodes and may reach a diameter of several centimeters. They are subject to rapid growth with increased intracapsular tension, leading to alterations in blood supply, intranodal hemorrhages from the poorly supported easily traumatized vessel walls, and to malignant degeneration.

The colloid form of adenoma represents a more mature stage of cellular development, with large follicle formation, abundant colloid and stroma. That even this type may undergo malignant change is seen by the occasional proliferation of lining epithelium into papillary projections within the follicles forming thereby the papillary cystadenoma well known for its malignant potentialities.

Much controversy has existed over the probable origin of thyroid adenomas. The evidence

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**Friday, December 4—**

10 a. m. Massachusetts General Hospital Fracture Rounds

**Saturday, December 5—**

\*10 a. m. - 12 m. Staff Rounds at the Peter Bent Brigham Hospital Conducted by Dr. Henry A. Christian

\*Open to the medical profession

†Open to fellows of the Massachusetts Medical Society

November 27—The Boston Dispensary Clinical Staff Meeting See page 1047

November 30—Lecture on Arthritis at the Robert Breck Brigham Hospital. See page 1046

November 30—Pharmacopoeial Hearing in Washington D. C. Hotel Washington at 10 a. m. and 2 p. m.

November 30—Boston University Medical Society See page 1047

December 1—Boston Pathological Society See page 1047

December 1—Greater Boston Medical Society See page 1047

December 1—Lawrence Cancer Clinic See page 997 issue of November 19

December 2—New England Obstetrical and Gynecological Society, University Club, Boston

December 3—Medical Clinic, Peter Bent Brigham Hospital See page 1046

December 3—Faulkner Hospital Clinical Meeting See page 1047

December 3-5—Annual Conference of the National Society for the Prevention of Blindness Columbus Ohio

December 7—Physicians and medical students are cordially invited to attend a clinic presented by the Medical Surgical and Orthopedic Services of the Infants and Children's Hospitals at 4 p. m. on the first Monday of each month, in the Amphitheater of the Children's Hospital

December 8—Harvard Medical Society See page 1047

December 10—Pentucket Association of Physicians Hotel Bartlett 95 Main Street Haverhill, at 8 30 p. m.

December 11—William Harvey Society Auditorium Beth Israel Hospital Boston 8 p. m.

December 16—Massachusetts Eye and Ear Infirmary Monthly Clinico-Pathological Conference See page 949 issue of November 12

February 25, 26, 27, 1937—The New England Hospital Association Hotel Statler Boston

March 30, April 2, 1937—First International Conference on Fever Therapy Postponement notice See page 52 issue of July 2

April 21, 24, 1937—American Society for Experimental Pathology See page 1075 issue of May 21

October 25, 29, 1937—American College of Surgeons Chicago Illinois

**DISTRICT MEDICAL SOCIETIES****ESSEX SOUTH DISTRICT MEDICAL SOCIETY**

December 2—Salem Hospital Clinic at 5 p. m. Dinner at 7 p. m. Speaker Dr. John W. Strieder Associate Professor of Chest Surgery at Boston University School of Medicine Subject Pulmonary Suppuration

**FRANKLIN DISTRICT MEDICAL SOCIETY**

Will meet at the Weldon in Greenfield at 11 a. m. the second Tuesdays of January, March and May  
CHARLES MOLINE, M.D. Secretary

**MIDDLESEX EAST DISTRICT MEDICAL SOCIETY**

January 13, 1937—Bear Hill Golf Club Stoneham

March 16, 1937—Danvers State Hospital Danvers

May 11, 1937—Bear Hill Golf Club Stoneham

KENVETH L. MACLACHLAN, M.D. Secretary

1 Bellevue Avenue Melrose

**NORFOLK DISTRICT MEDICAL SOCIETY**

January 19, 1937—8 15 p. m. The Peter Bent Brigham Hospital Communications and Case Presentations by the Staff Suggested title—Abdominal Pain from the Medical and Surgical Standpoint Details of program to be announced.

February 23, 1937—Time place and details of program to be announced

March 30, 1937—8 15 p. m. New England Deaconess Hospital A Symposium on Diabetes entitled A Survey of the Diabetic Work of the George F. Baker Clinic in the New England Deaconess Hospital Communications and Case Presentations by the Staff. Drs. Elliott P. Joslin, Howard F. Root, Priscilla White, Alexander Marble and Allen P. Joslin

May, 1937—Annual Meeting Details to be announced

Note The Censors will meet for the examination of candidates on the first Thursday of May 1937. Fee of \$10.00 is payable at the time of examination. Application blanks may be obtained by writing the Secretary furnishing name address and name of school of graduation in medicine. Application must be made at least three weeks prior to date of examination. Candidates whose applications are on file will receive proper notices.

FRANK S. CRUICKSHANK, M.D. Secretary  
1247 Beacon Street Brookline

**PLYMOUTH DISTRICT MEDICAL SOCIETY**

January 21, 1937—11 a. m. Bridgewater State Farm.

March 18, 1937—11 a. m. Brockton Hospital

April 15, 1937—Annual Meeting 11 a. m. Duxbury Hospital

May 20, 1937—11 a. m. Lakeville State Sanatorium

FRED F. WEINER, M.D. Secretary  
231 Main Street Brockton

**SUFFOLK DISTRICT MEDICAL SOCIETY**

January 27, 1937—Boston Medical Library 8 15 p. m. Joint Meeting with the Boston Medical Library 'Anthropology' Dr. Carleton S. Coon

March 31, 1937—Boston Medical Library 8 15 p. m. Social Insurance—It Affects the Medical Profession Dr. Charles E. Mongan Discussion Dr. Channing Frothingham

April 28, 1937—Annual Meeting Boston Medical Library 8 15 p. m. Problems in Surgical Diagnosis Dr. Howard M. Clute

CONRAD WESSELHOEFFT, M.D. President,  
CHARLES C. LUND, M.D. Secretary

**WORCESTER DISTRICT MEDICAL SOCIETY**

December 9—St. Vincent Hospital Worcester Mass 6 15 p. m. Dinner—complimentary by the hospital. 7 30 p. m. Business session and scientific program

January 13, 1937—Worcester City Hospital Worcester, Mass 6 15 p. m. Dinner—complimentary by the hospital. 7 30 p. m. Business session and scientific program

February 10, 1937—Worcester State Hospital, Worcester Mass 6 15 p. m. Dinner—complimentary by the hospital. 7 30 p. m. Business session and scientific program

March 10, 1937—The Memorial Hospital Worcester, Mass 6 15 p. m. Dinner—complimentary by the hospital. 7 30 p. m. Business session and scientific program

April 14, 1937—Worcester Hahnemann Hospital Worcester, Mass 6 15 p. m. Dinner—complimentary by the hospital. 7 30 p. m. Business session and scientific program

May 6, 1937—At 4 30 in the rooms of the Worcester Medical Library Inc. at 34 Elm Street Worcester will be held the spring meeting of the Board of Censors

Wednesday Afternoon and Evening May 12, 1937—Annual Meeting Time and place for this meeting will be announced in an early spring issue of the Journal.

ERWIN C. MILLER, M.D. Secretary  
27 Elm Street, Worcester

**BOOK REVIEW**

**Urology in Women** A Handbook of Urinary Diseases in the Female Sex E. Catherine Lewis  
Second Edition 100 pp. Baltimore William Wood & Company \$2.25

This is a monograph on the urologic conditions in women. As the author states in the preface, 'It is not intended to be a complete treatise on urology but rather to emphasize certain points which have a particular application to women patients.' A section each is devoted to urethra, bladder, ureter, and kidney. Such pathologic entities as vesicovaginal fistula, interstitial cystitis, and strictures of the ureter are well treated. Only a small section is devoted to pyelitis, and pyelonephritis of pregnancy.

On the whole the book is well written but nothing new is found in this monograph that cannot be found in any good text of urology or gynecology.

experienced a hemorrhage so massive that it quickly enlarged the thyroid gland and compressed the trachea with immediate danger to life. This has been reported however, with death resulting in a very short time. In one of our cases (D. A. F.), serious dysphagia was present shortly after the hemorrhage and necessitated an emergency operation. Hemorrhage may arise either spontaneously or following blunt trauma, such as from a blow, shove, or fall upon a sharp-edged object. Relatively slight trauma to a nodular goiter has been known to produce a violent hematoma. The enlarged thyroid, especially one under tension, is much more easily traumatized than the normal thyroid gland. Rupture of cystic goiters has also been frequently reported, and since these cases are mostly traumatic the hemorrhage results not from bursting of the nodular capsule but from the adjacent torn thyroid tissue.

The following case report of 1 of our 5 cases with hemorrhage gives a typical story of the patient who has sudden bleeding into a thyroid adenoma.

Dr. A. F. aged 56 years was seen August 27, 1935. Ten days ago he contracted dermatitis venenata of the face which spread down on his neck. This cleared well. Four days ago there was an onset of mild pharyngitis. Three days ago moderate swelling and tenderness developed in the right lower neck. The day before admission the pressure became more pronounced and serious difficulty in swallowing appeared. The neck swelling increased and fever of 101° developed.

Examination showed the dermatitis venenata to have largely disappeared. The right lobe of the thyroid was replaced by a very large, firm, excruciatingly tender adenoma which was partly substernal and pushed the larynx and trachea markedly to the left. A diagnosis of adenoma of the thyroid with acute infection or acute hemorrhage was made and immediate operation carried out. An adenoma the size of a large orange (10 cm. in diameter) partly substernal replaced the right lobe of the thyroid gland. All the tissues of the neck were markedly edematous and hyperemic. The deep muscle (thyrohyoid) was firmly adherent to the adenoma. The latter was removed intact and on gross section it was evident that acute hemorrhage had occurred in the parenchymatous adenoma. The wound was closed with drainage. Recovery was uneventful with gradual disappearance of the edema of the neck. Microscopic examination showed multiple colloid adenomatous goiter with necrosis and hemorrhage.

Most intranodal hemorrhages are not of an immediately serious nature. They are either local or very limited and develop slowly so that the more marked symptoms of compression are lacking or relatively mild. They usually occur in the central part of the node where a central hemorrhagic infarct may be seen in contrast to the peripheral zone. If the hemorrhage is small, resorption frequently supervenes with new growth of vascularized connective tissue plus moderate lymphocytic infiltration with later deposition of cholesterol crystals, resulting in a brown pigmented scar.

Hemorrhage into a thyroid adenoma must generally be differentiated only from an acute inflammation of a goiter which it most closely resembles. Usually no question of diagnosis between hemorrhage or malignant degeneration arises since even the most serious malignancy requires more than the few hours or days needed to produce the sudden swelling of a hemorrhage into an adenoma. To decide whether an adenoma is acutely inflamed or acutely swollen from hemorrhage is often difficult and at times impossible. In 2 of our cases a fever and low leucocytosis accompanied the acute swelling. Local tenderness was marked, and we were uncertain until operation which of the two possibilities was present. In either case, however, immediate operation is indicated.

It has long been recognized that the goitrous thyroid is much more often beset with inflammatory processes than the normal thyroid gland.



FIGURE 1. Typical thyroid adenoma in girl of 20 years. Note the asymmetrical discrete swelling of the left thyroid lobe due to the single encapsulated tumor. Surgical removal indicated to prevent later complications such as hemorrhage, pressure, cancer or toxicity.

Lebert (1862) quoted by Wegelin<sup>1</sup> differentiated thyroiditis and strumitis that is inflammation of the normal gland versus that of the goitrous gland. Kocher in 1878 first recognized the metastatic and infectious nature of strumitis. He clearly showed that the disposition of the adenoma for inflammation resulted from its regressive changes and from the lessened vitality of its tissues. He believed that (1) cysts and hyperplastic goiters with circulatory disturbances (thrombosis, hemorrhage) and (2) degenerative changes (fatty degeneration, deposition of colloid, necrosis) were especially suited for the localization of blood-borne microorganisms.

In general strumitis will develop in large rather than in smaller nodes, and since the larger are more frequent in areas of endemic goiter, strumitis will be found more often in these localities.

rather favors development from the epithelium of preexisting follicles in the normal thyroid gland, rather than from rests of embryonal epithelium. Woelfel's clinical impression that adenomas arose from embryonal rests has persisted, though it has not received the support of those who have since made intensive pathological studies of this problem (Vichow, Hitzig and Michaud, and Wegelin<sup>1</sup>). There have been no confirmed findings of embryonal rests or nodes in the fetus or the newborn.

As with most nodular tumors, central necrosis with replacement fibrosis commonly occurs, due both to inadequacy of blood and lymph supply and to gradual aging of the central cells. Advancing growth of the tumor tissue is almost exclusively peripheral. Such regressive changes as fibrosis, hyalinization, mucoid, amyloid and fatty degeneration, calcification and actual bone formation are known to occur. These changes occurring in the blood vessel walls themselves form the anatomic basis for disturbances in circulation, that is, ischemia, edema, hemorrhage, thrombosis, infarction, embolism, and cyst formation which are of great importance for the further fate of the adenoma.

And lastly it may be pointed out that different stages of development and differentiation, that is, both parenchymatous and colloid characteristics, may occur in different parts of a single adenoma.

While the size of an adenoma may vary from one millimeter to the size of a man's head, these huge masses are not pure adenomas. They almost without exception show extensive cyst formation which owes its origin to secondary changes, namely previous hemorrhage within the adenoma. Pure adenomas reach at most a diameter of five to six centimeters. The most frequent range is between one-half and four cm. in diameter.

Although adenomas may occur at any age, they become notably frequent from puberty on, and show thereafter a higher incidence with increasing age. Rare cases of single adenoma in infants have been reported (Hueck<sup>1</sup> and Wegelin<sup>1</sup>).

We are convinced that the viewpoint that a discrete adenoma may be left alone until it causes symptoms is incorrect since the thyroid adenoma is so frequently the origin of complications other than hyperthyroidism. In order that we may emphasize the necessity of undertaking active treatment of discrete thyroid adenomas when found, we wish to review the various complications that may occur in these cases and to illustrate them by brief case reports from our practice.

The diagnosis of a discrete adenoma of the thyroid is usually easy but at times it is almost impossible. It is usually noted as a one-sided asymmetrical encapsulated tumor of either lobe or isthmus of the thyroid. It moves

with swallowing, and because it is entirely surrounded by a capsule it can be readily felt to "jump" through the examiner's fingers as the patient swallows. With care one can feel that he is palpating a rounded, spherical tumor and not a thickened, lower thyroid pole. The commonest error in the authors' experience, however, has been in mistaking a somewhat enlarged and convoluted inferior border of the thyroid for an encapsulated discrete adenoma. Experience in palpating the thyroid will enable one correctly to distinguish these possibilities.

Occasionally a discrete thyroid adenoma will be completely substernal, and no evidence of its presence can be seen or felt in the neck. This is rather unusual, but may be suspected when a patient states that a goiter formerly present has disappeared, or when evidences of tracheal pressure are found. This type of adenoma will be found by x-ray studies of the trachea and mediastinum. Most discrete adenomas of the thyroid will be visible, however, and at least their superior borders will be felt when the patient swallows. Inability to palpate the entire circumference of such a tumor or to palpate its lower borders warrants an x-ray at once to determine how deeply it descends into the chest.

As previously emphasized, the discrete adenomas are to be distinguished from thyroid enlargements due to degenerative changes with the development of many irregularly placed nodules. Perhaps 15 per cent of these multiple colloid adenomatous goiters will have coincidental "fetal" adenomas in them, many of which can be found only on histologic study and are not included in the present discussion. It is frequently impossible, however, to know from clinical examination whether an adenoma is fetal or degenerative in type.

In our experience with many thousand goiter cases, it is our impression that the commonest complications of thyroid adenomas are hemorrhage into the adenoma, malignant degeneration, and pressure on nearby structures. Additional complications of adenomas that we have observed are hyperthyroidism, acute or chronic inflammation, and trauma.

In 62 cases of discrete adenoma of the thyroid seen by us in the past 15 months, acute hemorrhage has complicated 5 cases.

In the larger adenomas, the increased tension of the capsule and accompanying compression of the thin walled veins cause a slowing of circulation so that congestive hyperemia is a very frequent manifestation. On the other hand narrowing of the afferent vessels as a result of hyaline degeneration or calcification can reverse the process, so that the parenchyma becomes inadequately nourished and degenerates in consequence of increasing ischemia.

Although hemorrhage is a relatively frequent complication in adenomas, none of our patients

noma. In these cases it is necessary not only to remove the adenoma but also to do a subtotal thyroidectomy to effect a cure. Clinically these patients show the evidences of more severe toxicity than the usual patient having only an adenoma as the cause of the trouble. The metabolism is high—frequently above +40—and the case resembles exophthalmic goiter on examination. At operation one finds on exposure of the thyroid that the gland area not involved by the adenoma is made up of the typical hyperplastic tissue that is associated with exophthalmic goiter. The removal of most of this tissue as well as the adenoma is necessary to cure the patient of toxicity.

The fact that cancer may develop in an adenoma that has been without symptoms for years

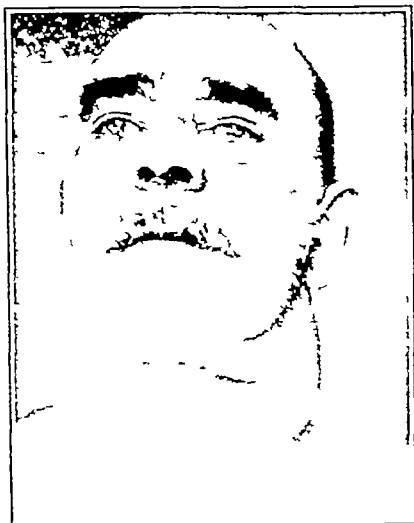


FIGURE 3. Man, aged 60 years with adenoma of the thyroid which had grown rapidly in past 6 months and was the seat of extensive malignant degeneration. Earlier operation would have increased the chances of cure.

cannot be too strongly emphasized. Cancer is not a rare complication of goiter since at least 2 per cent of malignancy is commonly seen in most goiter clinics. It is of course generally recognized that the vast majority of these cases—certainly over 90 per cent—are found on pre-existing adenomas. In our recent series of 62 patients having a discrete thyroid adenoma 6 or over 10 per cent, showed malignant degeneration. This figure is probably high as an index of the frequency of malignancy in thyroid adenomas but there is no doubt in our minds that the patient with a discrete thyroid tumor has at least five or six chances in a hundred that cancer will develop in it.

We wish briefly to relate two typical histories of the patient who has cancer of the thyroid. The first is an example of the situation in which malignancy is unsuspected by the clinician and is found only by the pathologist.

CASE No 338 R. H. H. aged 54 years seen on September 10, 1935 complained of a symptomless goiter present for 20 years and showing recent growth. There was an orange-sized movable swelling in the right lower neck. At operation a 7 cm firm adenoma was found to occupy the major portion of the right lobe of the thyroid. At the upper pole of the lobe there was a small hard adenoma 1 cm in diameter which raised the suspicion of malignancy. Both adenomas were removed. The left lobe appeared normal. Microscopic examination showed fetal adenoma and papillary adenocarcinoma.

Recovery was good and a series of 15 x-ray treatments (totaling 4000 R) was given with the 200 K. V. machine, through three portals to the bed of the thyroid. At the end of 7 months (April 15, 1936) examination showed the patient to be in excellent condition with no evidence of recurrence.

This patient has we believe an excellent prognosis since the tumor was removed very soon after evidences of malignant change appeared. He would have been far better off if the adenoma had been removed at any early period of its 20 year life.

The next case report is typical of the patient who has an adenoma for years which begins to grow and who even then postpones treatment. Earlier removal in this woman would have given a good prognosis. At present her chances of a return of malignancy are, in our opinion very large.

CASE No 839 Mrs. M. L. aged 61 years had had a swelling in the left neck for over a year. In the last 3 months symptoms of choking fatigue with talking and change in tone of the voice occurred. Examination revealed a firm adenoma of the left lobe of the thyroid discrete and apparently well encapsulated. At operation however it was found that malignant degeneration was present. The capsule was involved posteriorly by the malignant process. Radical removal of the left lobe was carried out with normal recovery. The pathologic report showed papillary adenocarcinoma. An intensive course of x-ray treatment is now being given.

The constant repetition of experiences such as these makes us feel very strongly that the medical man today must recommend the removal of discrete thyroid tumors in order to prevent thyroid cancer. With our present knowledge no other course is open in dealing with these cases.

Unsightliness of goiters especially of the asymmetrical adenoma type is well recognized and in our opinion is an adequate indication for their removal. In good risk patients having a benign adenoma we believe there should be no mortality associated with the surgical removal and our experience with these cases permits us to feel free to advise operation with this knowledge.

Pressure on the structures of the neck is a frequent complication with discrete adenomas of the thyroid. The larynx and trachea are commonly affected as the adenoma rotates the larynx and narrows the diameter of the trachea by pushing it from the midline. Difficulty in swallowing, curiously enough is extremely rare even

Strumitis may occur in simple acute form, with lymphocytic infiltration and swelling, which gradually disappears, in purulent form and in gangrenous form. Purulent liquefaction, wherein the interior of the adenoma forms an abscess cavity, may supervene. Solitary abscesses are more frequent than multiple abscesses in several nodes. Etiologically, Kocher's dictum that strumitis rests on metastatic bacterial infection applies today for most strumitides. Direct infection from without, by puncture and trauma, is extremely rare. Direct infection from the larynx and trachea is still open to question, but is generally accepted as a common cause of strumitis.

Acute strumitis has been observed in the

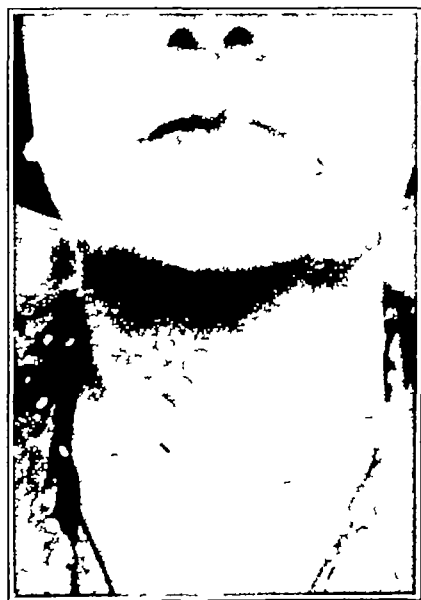


FIGURE 2. Close-up of scar 6 months after thyroid operation. Good scars and no mortality should be expected after the removal of a simple adenoma of the thyroid.

course of most infectious diseases. The symptoms are referable locally to the adenoma rather than to the entire gland. Painful enlargement of the adenoma, tenderness, dysphagia and fever suggest the diagnosis. Redness and swelling of the overlying cutaneous tissues are rare until late in the disease. Timely incision and drainage or excision of the infected adenoma will abort the danger of general spread, peristrumitis with mediastinal extension, or rupture of the abscess into the esophagus, trachea or mediastinum.

The strumitis can be wholly chronic in form, manifested by low-grade suppuration, infiltration with lymphocytes and plasma cells, and overgrowth of connective tissue. More frequently chronic strumitis follows the acute stage leading to eventual healing. The iron-hard Riedel's struma develops on previously normal or diffusely hyperplastic thyroid tissue and in

this way is related more closely to thyroiditis than to strumitis. It occasionally appears in adenomas.

Although several cases in this series of discrete adenomas showed varying degrees of strumitis, acute and chronic, it was of histologic rather than clinical importance. None showed abscess formation or massive gangrene, and we believe these complications are rare in this area.

Outspoken hyperthyroidism in patients with solitary discrete adenomas has been reported by many observers, and this has been established both by clinical tests and microscopic examination. That the enucleation of the adenoma alone has generally allayed the manifestations of hyperthyroidism has been our experience. These cases have been designated "toxic adenomas" by Plummer, Goetsch, Wilson and Boothby (quoted by Wegelin<sup>12</sup>). They believe the secretory activity of the adenoma may express itself chiefly in elevation of the metabolism, in tachycardia and in nervous disturbances, while the typical picture of exophthalmic goiter which is associated with hyperplasia of all the thyroid tissue does not develop. With this we are in agreement.

The histology usually shows an adenoma of large follicle type, with marked epithelial growth, polymorphism of the follicles, papillary structure, and thin liquid colloid—in short, many manifestations found in genuine diffuse exophthalmic goiter.

Biologic tests, that is, the effect of thyroid substance on the development and growth of tadpoles, have shown that (1) extracts from adenomas, (2) extracts from normal thyroid tissue, and (3) industrial thyroid extracts have the same physiologic action. The adenoma extracts, however, are usually less powerful in their effect (Wegelin<sup>12</sup>).

Three patients in our series showed clinical evidence of hyperthyroidism, which was relieved following excision of the adenoma. One patient (No. 554, Mrs. F. B. D.) aged 48 years with a 7 cm. adenoma of the left lobe for 15 years, experienced definite growth of the adenoma during the past year, together with nervousness, palpitation, tremor, and loss of 26 pounds despite increased appetite. Basal metabolism rate at home was +30 and at the hospital, after the use of Lugol's solution, it was -6. At operation the thyroid gland appeared normal except for the large cellular parenchymatous adenoma of the left lobe. Excision has been followed by striking relief of the patient's symptoms. Secondary hyperplasia within the adenoma has been reported on not a few patients in this series.

There are, however, other patients who have severe hyperthyroidism whose thyroid glands show hyperplasia with a coincident discrete ade-

diagnosis, with the resulting less commendable and often detrimental treatment of such a case may be avoided by continually bearing in mind the not unduly rare ingestion or aspiration of a button safety pin tack or peanut by the infant or child. In any case of chronic bronchitis bronchiectasis, unresolved pneumonia or asthma the presence of a foreign body in the bronchial tree must be carefully considered. In any case of supposed laryngitis or even common croup cyanosis, dyspnea, inspiratory stridor or unexplained dysphagia, a safety pin, button, peanut or other foreign body must be thought of. Often the presence of a foreign body may be entirely overlooked after several months or years have elapsed when the acute symptoms have subsided and when the clear details of an otherwise accurate history have long since vanished. According to Chevalier Jackson the most important thing to remember as to symptoms (of foreign bodies) is that there may be no symptoms at all at the time the patient is seen. There is a 'symptomless interval' after the initial symptoms, in nearly all cases. The interval may be only of a few hours in the case of a vegetal foreign body in the bronchus of a baby; it may be many months in the case of a non-obstructive metallic substance in the bronchus of a patient of any age."

The presence of such foreign bodies in the respiratory or upper digestive tract is not of infrequent occurrence especially when the total number of admissions to any children's hospital is considered. We feel that this fact is not fully appreciated by practitioners not primarily dealing with infants and children, for if it were many such patients would not be treated so long without improvement. Needless to say if the possibility of foreign body is always borne in mind and adequately and conscientiously traced down, the patient will be given the tremendous benefit of early removal before further damage is done, and the physician will thereby be rewarded by the satisfaction of having offered to the patient and the family his best and most valuable service.

During a short four months period (December 1, 1935, to March 31, 1936) there were admitted to the Ear Nose and Throat Service of The Children's Hospital in Boston nine cases of foreign bodies either in the larynx, bronchi or esophagus all of which were successfully removed. It is our purpose to report these cases in the hope that they may serve as a reminder that the aspirated or ingested foreign body is an omnipresent and often troublesome factor

for otitis media, scarlet fever and ulcerative stomatitis. Her past history was essentially negative. Sixteen hours before admission while playing at home with some coins she was noted suddenly to gag, choke and vomit. From then on she was unable to swallow any solid food offered but could take liquids fairly well. No cyanosis or respiratory difficulty was observed. Physical examination was essentially normal. X-rays showed two coins superimposed in the upper esophagus—one the size of a penny the other of a nickel. The lungs showed a slight amount of peribronchial congestion compatible with a bronchitis.



FIG. 1 (Case 1) A-P film shows coin in esophagus



FIG. 2 (Case 1) Lateral film shows two coins superimposed

On the day of admission esophagoscopy was performed under avertin anesthesia and the two coins were easily removed with alligator forceps. The patient had no reaction to the operation and was discharged improved 2 days later on December 3, 1935.

*Comment*—This case illustrates among other things the importance of taking both anteroposterior and lateral plates when dealing with a suspected foreign body. In this instance these coins were superimposed. Had only an anteroposterior film been taken the penny would have been obscured by the nickel. A foreign body the plane of which coincides with that of the body is usually found to be in the esophagus while one lying in the anteroposterior plane is more apt to be found in the larynx or trachea.

2 D. H. (197873) Age 2 7/12 years Male

This patient was admitted on December 20, 1935 because of persistent cough associated with wheezing and an asthmatic type of respiration of 2 1/2 weeks duration. The patient's uncle, one grand father and a great grandmother were all subject to asthmatic attacks. In infancy the child had been treated for eczema. Two and a half weeks before admission the child suddenly coughed, choked and gagged while eating some nuts. This attack was associated with momentary cyanosis. During the following 2 1/2 weeks there was persistent dry cough without fever but associated with definite wheezing.

#### CASE REPORTS

1 R. F. (191810) Age 2 8/12 years Female  
This patient was admitted on December 1, 1935 because of difficulty in swallowing of 16 hours duration. Her family history was unimportant. Except

with very large thyroid tumors. Dysphagia occurs when a sudden swelling of the thyroid arises or when there is malignant degeneration which has fixed the pharyngeal or esophageal wall. Changes in the voice and paralysis of a vocal cord rarely, if ever, are seen except in the presence of malignant degeneration of the adenoma which has invaded the area of the recurrent laryngeal nerve. Weakness of the voice or hoarseness accompanying a thyroid adenoma are of serious prognostic significance.

## SUMMARY

In an experience with several thousand goiters, we have been impressed with the frequent occurrence of various complications arising in thyroid adenomas. A categorical study of the complications found in the authors' recent cases has been made.

## CONCLUSIONS

- 1 The solitary discrete adenoma does not arise as a result of degenerative processes as does the multiple colloid adenomatous goiter. It should be regarded as a tumor arising in an otherwise normal thyroid gland.
- 2 The serious menace of the discrete adenoma should not be evaluated by its effect on the metabolism, which usually is slight. This should but rarely enter into the decision regarding treatment.
- 3 The thyroid adenoma inclines in structure toward the different developmental stages of the normal gland.
- 4 Adenomas may be classified as either parenchymatous or colloid in form.
- 5 Opinion favors the origin of adenomas from the epithelium of preexisting follicles in the normal thyroid gland, rather than from rests of embryonal epithelium.

- 6 Hemorrhage into the adenoma (5 cases) and malignant degeneration (6 cases) were the commonest complications found in the authors' series (62 cases).
- 7 Strumitis is more frequently found in areas of endemic goiter and is rare in this part of the country.
- 8 Clinical evidence of hyperthyroidism occurred in three patients with discrete adenomas. Secondary hyperplasia within the adenoma was reported in several patients.
- 9 Cancer arising within a discrete "fetal" adenoma may occur with unexpected and tragic frequency. Delay in removal of the adenoma will, in not a few patients, invite disaster.
- 10 Injury to the recurrent laryngeal nerves by benign pressure is an extremely rare finding. The development of voice changes in the patient with a thyroid adenoma is of serious significance.

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## FOREIGN BODIES IN THE AIR AND FOOD PASSAGES\*

## A Report of Nine Recent Cases

BY CHARLES I. JOHNSON, M.D.† AND CHARLES F. FERGUSON, M.D.‡

IT is not the purpose of this paper to present any new discussion of foreign bodies in the air and food passages or even to attempt in a minute way to rival the tremendous series of over three thousand such cases reported by Chevalier Jackson and Chevalier L. Jackson.† We feel, however, that it is of great importance

to keep constantly before the eyes and in the minds of the general medical profession the significant role played by foreign bodies in infants and children as the cause of chronic bronchitis, unresolved pneumonia, laryngitis, chronic bronchiectasis and even atypical asthma.

The presence of a foreign body in the upper air or food passages is not always disclosed by a carefully elicited history, even in a suspected case, and at the same time is not always necessarily revealed by the searching eye of the x-ray—valuable as that procedure may be. Needless professional embarrassment, as well as inaccurate

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‡Diseases of the Air and Food Passages of Foreign Body Origin. Philadelphia W. B. Saunders Co. 1936.



about 2.5 cm in diameter lying transversely in the esophagus at the level of the first rib

A few hours after admission esophagoscopy was performed under avertin anesthesia and the button was easily removed with alligator forceps. The patient's temperature gradually came down to normal and his respiratory infection improved. He



FIG 5 (Case 4) A P film shows a button in the esophagus

showed no reaction to the operation. Three days later on January 21, 1936, he was discharged improved.

5 L. P. (199172) Age 10 months Male

This patient was admitted on January 24, 1936, to the Infants Hospital because of difficulty in breathing for 11 days. His paternal grandfather suffered with asthma. The patient's past history was essentially normal. Eleven days prior to admission while eating some crackers the child choked, gagged and vomited but there was no cyanosis or dysphagia. Following this episode he had considerable difficulty in breathing and progressive hoarseness associated with gasping inspirations and retraction of the chest. When the patient was placed in a supine position he choked and gasped for breath. From this time on a troublesome dry hacking cough had persisted. The family thought the child had severe croup but no medical attention was given. On admission the patient was in marked respiratory distress exhibiting both inspiratory and expiratory stridor to a marked degree.



FIG 6 (Case 5) A P film shows an open safety pin in the larynx, half above and half below the glottis

There was no cyanosis. On inspiration marked retraction of the sternum was noted. The lungs except for an occasional moist rale were normal. X-rays on admission showed a small open safety pin in the larynx with the point upward and forward. Half of the pin was above the glottis and half below. The lungs and abdomen were negative

A few hours after admission under avertin anesthesia laryngoscopy was performed. A small gold safety pin was easily removed. There was no bleeding. During the 24 hours after operation there was no change in the dyspnea or hoarseness. The following day his condition was much improved, and his hoarseness and dyspnea were completely cleared. There was no further evidence of obstruction. He was discharged improved on February 1, 1936, 8 days after operation. At this time his voice was normal, and respiration was without difficulty.

*Comment*—This case illustrates the fact that a foreign body as large and as sharp as a safety pin may remain in the larynx for nearly 2 weeks with relatively mild symptoms. As noted above, a foreign body in the larynx is usually found lying in the anteroposterior plane. Further questioning of the mother revealed no evidence of aspiration of the pin, and the mother had no idea where it came from.

6 C. G. (107088) Age, 20 months Male

This patient was admitted on January 31, 1936, because of cough of 8 months duration. His family history and past history were negative. For the previous 8 months the patient had been suffering from a persistent, dry hacking cough with no initial history of dyspnea, choking or cyanosis. He was referred into the Medical O. P. D. for a complete



FIG 7 (Case 6) Lateral film shows the tack in the bronchus

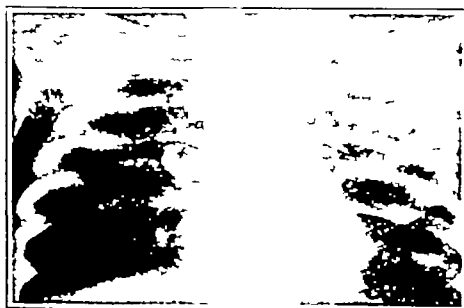


FIG 8 (Case 7) A P film shows an upholstery tack in the left main bronchus about 3 cm below the bifurcation.

medical workup as a case of chronic bronchitis or asthma. There skin tests for protein sensitivity and an intradermal tuberculin (1:1000) test were negative. An x-ray of the chest showed clearly an upholstery tack point upwards in the left main bronchus about 3 cm below the bifurcation of the trachea. Physical examination on admission showed

respirations on occasions. There was no inspiratory stridor and no difficulty in swallowing. Physical examination on admission revealed a slight generalized lymphadenopathy. Examination of the chest showed the breathing to be normal, except for interruptions every few minutes by paroxysms of coughing. On expiration the left side of the chest was noted not to collapse, while inspiration appeared normal. On percussion the entire left side of the chest was so generally hyperresonant that the cardiac dulness was completely obliterated. On the left there were coarse râles on coughing with diminution of voice sounds throughout. X-rays showed obstructive emphysema with generalized hyperaeration of the entire left chest.

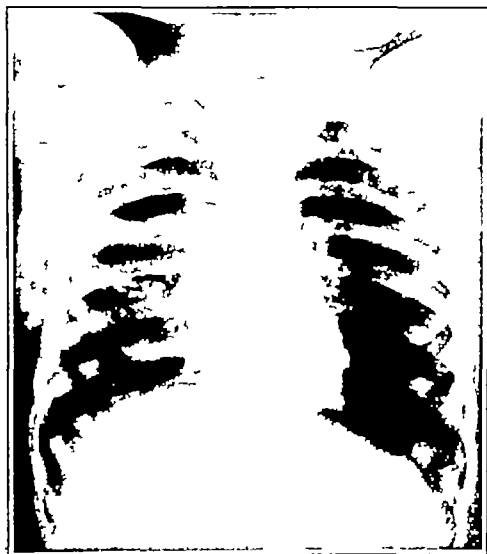


FIG 3 (Case 2) A P film shows obstructive emphysema on left due to a nut in the left main bronchus

On the day after admission, under pentobarbital and avertin anesthesia, bronchoscopy was performed and a piece of peanut was found almost completely occluding the left main bronchus and acting as a ball valve. The first grasp with the peanut forceps resulted in removal of only the skin of the nut. The rest of the foreign body was removed in two pieces. The following day the patient's temperature rose to 103° F, but came promptly down to normal and remained so until 4 days later. At that time the child developed a very mild, but definite scarlet fever and was transferred to the Isolation Service. Physical examination of the chest at that time was negative. X-rays of the chest taken 3 days after transfer (7 days postoperative) showed the lungs to be evenly expanded with no further evidence of foreign body. As the scarlet fever was very mild, the child was allowed to go home on December 28, 1935, 8 days after admission to the hospital.

*Comment*—This case presented both a family history and also a past history suggestive of allergy. The present illness was characterized by an asthmatic type of respiration, with wheezing and a paroxysmal cough. However, the very fact that these symptoms followed an attack of coughing while eating peanuts and that the physical signs in the chest were those of an obstructive emphysema demanded very careful in-

vestigation of the bronchial tree for the etiologic factor. A peanut, being a vegetal body, is unfortunately not revealed by x-ray. Yet bronchoscopy is definitely indicated and in fact, should be insisted upon. In unexplained asthma, then, the etiologic factor may be a peanut. This case also illustrates the importance of taking a foreign body story at its face value.

3 O C (190255) Age 29/12 years Female

This patient was admitted on December 21, 1935 because of substernal pain of 5 hours duration. Her family and past history were unimportant. Five hours before admission the child swallowed two safety pins. There was no cyanosis, choking or difficulty in breathing. No attempt had been made to feed the patient. X-rays at another hospital 1 hour later had revealed one open and one closed safety pin in the esophagus. Physical examination on admission was essentially normal. X-rays showed the two pins at the level of the second thoracic vertebra in the esophagus. Both were placed with their points down.

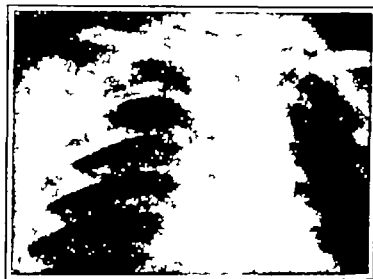


FIG 4 (Case 3) A P film shows one open and one closed safety pin in the esophagus

A few hours after admission esophagoscopy was performed under ether anesthesia, and each pin separately removed. The patient's course was entirely uneventful, and she was discharged improved on the following day, December 22, 1935.

*Comment*—This case illustrates the comparatively easy manner of removal and the calm postoperative course of a patient who is seen early. A safety pin that is open with the point up may prove to be a very dangerous factor. Its removal is also much more difficult, and the serious complications are more frequent the longer it is allowed to remain. Mediastinitis following the ingestion of an open safety pin is not uncommon.

4 B C (198459) Age, 18 months Male

This patient was admitted on January 18, 1936 because of inability for 24 hours, to swallow anything but liquids. His family and past histories were negative. Twenty-four hours before admission the patient had swallowed a button about 2.5 cm in diameter. At the time there was slight gagging and choking but no cyanosis or difficulty with respiration. Cough on lying down persisted and the child choked and gagged when offered solid food. He was able to swallow liquids without difficulty. X-rays taken outside showed the button in the esophagus. Physical examination on admission showed evidence only of a mild upper respiratory infection with a temperature of 101° F. X-rays showed a button

fibrous, organized blood clot was seen and removed with the grasping forceps. The rest of the bronchial tree was found to be clear. Following this a great deal more air was noted to be going into the right chest. X-rays taken 3 days later still showed a fairly dense infiltration at the right base most marked posteriorly. There was also a rather flocculent reaction at the left hilum. Her wheezing respirations cleared up, and her temperature remained normal. Her cough improved, and her general condition was better. Because of exposure to measles she was discharged home on March 21, 1936, to return to the O P D for further follow up.

*Comment*—No foreign body composed of glass was found at any time. The signs, however, were those of an obstructive emphysema, because of which bronchoscopy was performed. An actual foreign body was seen and removed with partial relief of symptoms. Apparently the bleeding from the first operation had been enough to form a clot, which later became organized and acted as a second foreign body, producing the same signs and symptoms as previously. After this clot was removed, examination showed that one portion of it was encircled by a narrow depression, as if it had been forced into one of the bronchi. This case also illustrates the importance of a thorough and very careful physical examination of the chest followed by well taken and accurately interpreted x-ray plates in any case of supposed pneumonia that has not resolved in the usual time or that has not followed the normal course. Wheezing respirations that come on rather suddenly in a child who has shown no earlier allergic background are very suspicious of foreign body. Unfortunately, the nature of this foreign body was never determined. Whether this case had gone on long enough to produce bronchiectasis remains to be seen.

S. A. R. (199560) Age 20 months Female

This patient was admitted on February 27, 1936, because of fever and unresolved pneumonia of 5 weeks duration. Her family history was negative. The patient was one of twins. Her past history was essentially normal. Nine weeks before admission the patient had a sudden coughing spell but there was no history of choking on a foreign body. This occurred while the patient was in Florida. She seemed to improve after a week and the local doctor said the girl had had an attack of acute bronchitis. Four weeks later the child became worse and developed cough and fever again. She was taken to a hospital in Florida where she was supposed to have had pneumonia in the left lung. She remained there 11 days during which time three blood transfusions were given. A chest tap was performed for a suspected empyema but no fluid obtained. Five days before the present admission the patient returned to Boston and at the same time had another recurrence of symptoms with fever, cough and general malaise. During the preceding 6 weeks she had lost considerable weight and the cough had continued. Examination on admission showed a small cachectic child who appeared chronically ill. Her tonsils were enlarged and chronically injected. Examination of the chest showed hyperresonance over the upper portion on the left side with marked

suppression of breath sounds and slight dullness at the base. There were no rales. The right lung was clear. The spleen was palpable two fingerbreadths below the costal margin and the liver one fingerbreadth. Her temperature averaged about 100°F. The white blood cell count was 26,000 per cmm. Her urine contained many pus cells. X-rays at the time of admission showed a large amount of fairly dense mottled infiltration at the left base, with hyperaeration of the left upper lobe. There was moderate displacement of the heart to the left. According to the roentgenologist the picture suggested the end result of occlusion of the left lower lobe bronchus with consequent bronchiectasis and partial occlusion of the bronchus to the upper lobe.

Two days after admission bronchoscopy was performed under avertin anesthesia. The bronchial mucosa was red and slightly edematous. In the left

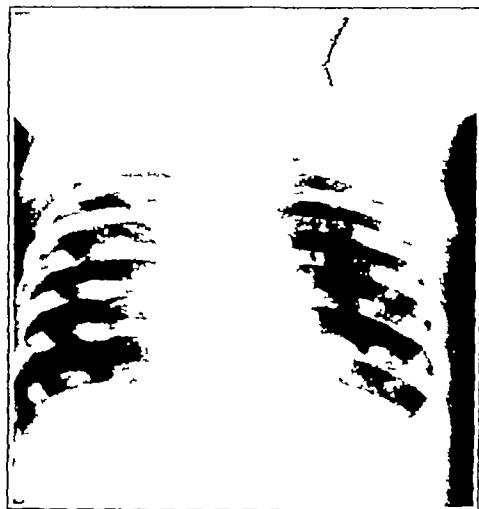


FIG. 10 (Case 5) A P film shows obstructive emphysema on left due to a foreign body in the left main bronchus (peanut)

lower lobe bronchus there was a fairly large amount of thick pus. After this was suctioned a piece of peanut which was seen low down in the bronchus, was suddenly coughed up through the bronchoscope. No further trace of a foreign body could be seen. Following operation the signs in the chest seemed to improve, but did not entirely clear. She continued to run some fever but had a definite pyelitis. X-rays taken 2 days after operation showed less hyperaeration of the upper portion and less mottling of the lower portion than before. The signs did not entirely clear however so a repeat bronchoscopy was done 10 days after the first. The left bronchus still contained pus. A very small narrow sliver of peanut was removed with the peanut forceps. The right bronchus appeared normal. Four days later x-rays still showed a moderate amount of rather dense infiltration at the extreme left base and less peribronchial infiltration in the midportions than before. She still continued to run a low grade fever associated with a few white blood cells in her urine. The signs in the chest improved but did not entirely clear. After her temperature had been normal for 4 days and her urine free from pus she was discharged on March 24, 1936, because of exposure to measles. She was to return to the O P D to be followed.

*Comment*—This case among other things illustrates the importance of a careful history

very slight diminution of breath sounds over the left chest posteriorly, with many, coarse bilateral rales. There was no difference in expansion or resonance.

A few hours after admission under avertin ether anesthesia bronchoscopy was performed, and the tack was removed. It was found to be imbedded in a fairly dense mass of granulation tissue on the bronchial wall. The patient's cough persisted for several days following operation during which time he ran a moderate elevation of temperature. A chest plate taken 3 days later showed slight, rather fine, flocculent, peribronchial infiltration on both sides. Otherwise, the lungs were essentially clear. His cough gradually cleared up, and his temperature came to normal. He was discharged improved 9 days after operation on February 9, 1936. He was then free from symptoms.

*Comment*—This case clearly illustrates the fact that oftentimes no history of coughing, gagging, choking, dyspnea, cyanosis, vomiting or difficulty in breathing can be elicited. The tack removed was one belonging in the upholstery of the patient's carriage. He had not been in the carriage for 8 months, and before that had been known to try to pull out the tacks. Looking backward, the mother recalled that one tack had disappeared shortly before his symptoms had developed. The appearance of the tack and the bronchus at the time of operation was compatible with at least an 8 months' stay. This case also illustrates the fact that a foreign body as large as a long upholstery tack may remain in a bronchus without the production of definitely acute symptoms. It also reveals the importance of early x-ray in any unexplained chest condition. Had this been taken soon after the development of symptoms, a great deal of unnecessary trouble might have been avoided. Bronchoscopy at that time would have been easier and less serious.

7 J B (199344) Age 3 4/12 years Female

This patient was admitted on February 6, 1936 to the medical service because of wheezing respirations for 4 months. Her family history was negative. Except for occasional attacks of tonsillitis her past history was also negative. Four months before admission she developed an upper respiratory infection for which nose drops were used. One day the dropper was found to be broken at the tip and the child insisted she had bitten it. Two days later she developed a wheezing type of respiration which continued to the time of admission. One month following the beginning of symptoms she developed a cough and was acutely ill with high fever, dyspnea and wheezing respiration. She remained in bed for 1 month. From then on she lost weight steadily. Four days before admission she developed signs of another respiratory infection. The attack for which she had remained in bed for 1 month had been diagnosed as pneumonia. On admission the patient was breathing with a marked wheeze and had a loose persistent cough. Her nose was running and her tonsils were large and red. Examination of the chest showed some diminution of motion of the right side on inspiration. The upper portion of the right chest was hyperresonant with dullness and diminished breath sounds over the right lower lobe. There were rales and rhonchi over both

upper lobes. The liver was 2.5 cm below the costal margin. X-rays and fluoroscopic examination showed the entire right lung to be hyperaerated apparently due to incomplete blocking of the right main bronchus—the findings of obstructive emphysema. There was considerable coarse peribronchial infiltration and congestion radiating from both hila. The bronchi at the bases appeared dilated and surrounded by circumscribed zones of dense peribronchial thickening compatible with bronchiectasis.

While on the ward her temperature ranged around 100°F. A general workup, including a tuberculin test, was otherwise not remarkable. One week after admission under avertin anesthesia, bronchoscopy was performed. The bronchial mucosa on the right appeared red and thickened. A moderately large area of soft granulation tissue was seen in the right main bronchus. This was removed with small grasping



FIG. 9 (Case 7) A P film shows obstructive emphysema on right due to incomplete blocking of right main bronchus (foreign body)

forceps. It was found to contain a small triangular, yellowish, fairly hard bit of foreign material measuring 4 by 4 mm and resembling a bit of celluloid. On pathologic examination after various chemical tests had been performed it was suggestive of some fibrous and cellular plant material. Following removal, there was a moderate amount of bleeding which was controlled with cocaine and adrenalin. Two days after operation x-rays showed the same congestion about the hila as well as a rather localized area of increased density in the right lower portion of the lung medially. The right side was still more aerated than the left, but fluoroscopically air was seen to go in and out on both sides. Her general condition improved a great deal and the signs of emphysema were much less marked. Two weeks after operation on February 27, 1936, she was discharged improved.

Three weeks after discharge she was seen in the O P D where it was noted that she had gained 3 pounds. Her wheezing respirations and a slight cough had persisted. Accordingly for this reason she was readmitted on March 12, 1936. At this time the right chest was found to be dull at the base with marked suppression of breath sounds but no rales. There was suppression of breath sounds over the anterior portion of the right chest low down. X-rays at this time still showed rather flocculent peribronchial congestion on both sides medially and an area of fairly dense residue over the right middle lobe somewhat less than when seen before.

Two days after admission under avertin anesthesia bronchoscopy was again performed. Low down in the right main bronchus a fairly large firm

Palisade arrangement of the peripheral cells of the masses is a characteristic feature. The tumor often appears to be multicentric in origin having several distinct points of growth from the overlying skin and occasionally from skin appendages. Intercellular bridges may be present, but are rare. Occasionally melanin occurs in varying amounts. The nuclei are oval with rather finely divided chromatin. Mitoses vary in number, but are rarely more frequent than five per 1,000 cells.

The basal cell carcinoma with foci of keratinization is identical with the basal cell carcinoma except for the existence of well-formed epithelial pearls with keratin or parakeratin in the centers of many of the cell clusters.

The mixed epidermoid and basal cell carcinoma is, as its name implies, merely a combination in varied proportions of epidermoid carcinoma and basal cell carcinoma. The epidermoid portions are not always well keratinized and may be relatively undifferentiated. In the majority of cases it probably does not represent a further stage of development of the basal cell carcinoma with foci of keratinization. It is rather a tumor in which the growth differentiates both as keratinized and nonkeratinized epithelium. There are a few tumors of basal type which merge into undifferentiated carcinoma without keratinization.

In the hair matrix carcinoma, the hair follicle structure is reproduced with varying degrees of faithfulness. This group we restrict to those tumors with formation of branching clusters of epithelial cells, continuous with skin and often with preexisting hair follicles, in the centers of many of these cell masses, a distinct whorl-like arrangement of the cells with some keratinization simulates shaft formation. The complete development of hair follicle structure in all its stages has not been reproduced in any of the tumors studied. Such adult follicles as may be present within the bounds of the tumor we regard as inclusions. The large amount of pigment seen in some of these tumors may cause difficulty in differentiating them and melanomas. The hair matrix carcinoma has points in common with the basal cell carcinoma with foci of keratinization, and many of the latter may in reality be of hair matrix origin with marked keratinization of abortive follicles.

In the fifth group, which is less well defined than the others, we have included those tumors which are identical with the basal cell carcinoma except for the presence of an unusual number of large or small cysts. These cysts are usually quite clearly the result of degeneration of either tumor or stroma although in some instances their origin is difficult to determine. It must be remembered that degeneration is common to all these tumors, and cyst formation is

TABLE 1

## DISTRIBUTION OF TUMORS IN 302 PATIENTS

Location	Basal Cell Carcinoma			Basal Cell Carcinoma with Foci of Keratinization			Mixed Basal Cell and Epidermoid Carcinoma			Hair Matrix Carcinoma			Cystic Basal Cell Carcinoma			Total		
	Sex		Total	Sex		Total	Sex		Total	Sex		Total	Sex		Total	Sex		Total
	M	F	Tumors*	M	F	Tumors	M	F	Tumors	M	F	Tumors	M	F	Tumors	M	F	Tumors
Upper lip	34	16	71	3	2	5	4	4	8	12	3	15	1	—	1	54	45	100
Lower lip	27	11	38	4	3	7	6	1	7	5	3	8	1	1	2	43	19	62
Upper lip	27	11	40	3	3	6	5	1	6	8	5	13	—	—	—	43	22	67
Lower lip	10	7	18	—	—	—	2	—	2	2	—	2	—	—	—	14	7	22
Lower lip	6	1	9	1	1	2	2	—	2	2	—	2	—	—	—	11	4	15
Neck	3	—	3	—	—	—	1	—	1	1	—	1	—	—	—	6	—	6
Scalp	5	3	9	2	1	3	1	—	1	1	1	2	1	—	1	10	5	16
Trunk	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1
Extremities	1	2	3	1	—	1	1	—	1	1	1	2	—	—	—	5	6	11
Total	115	78	201	14	10	24	23	8	31	32	14	46	1	1	5	191	111	307

\*Discrepancy in totals due to multiple tumors

physical examination and accurately interpreted x-ray plates. If there are signs of obstructive emphysema, the source of the obstruction must be determined by bronchoscopy. It is surprising that such very minute bits of foreign material as the tiny sliver of peanut removed at the second bronchoscopy are not coughed up. Though these bodies may be small the bronchial tree is unable to take care of them, and they remain as sources of continued irritation and the causes of later bronchiectasis. The longer the foreign material is allowed to remain in the bronchial tree, the more rapidly progressive is the bronchiectatic process. Needless to say, the treatment of bronchiectasis is long and complicated and far from satisfactory. For this reason, prophylaxis is by far the more important factor.

9 R. L. (199747) Age, 2 5/12 years Male

This patient was admitted on March 21, 1936, because of abdominal pain following the ingestion of a button 48 hours previously. The family history showed that the paternal grandmother had diabetes. The patient's past history was normal. He had been born with a right inguinal hernia, but, except for local swelling, it had never caused him any trouble. He had worn a truss from early in fancy. Forty-eight hours before admission the child put a large button into his mouth, and suddenly coughed, choked and gagged as he swallowed it. Following this he vomited. Since that time he had complained of vague abdominal pain, but there had been no further vomiting. He had been able to eat without difficulty. On admission physical examination was normal, except for a slightly injected throat and a moderately large right inguinal hernia, which was supported by a truss. X-rays on admission showed a large button lying transversely in the

esophagus at the level of the sternoclavicular joints.

One-half hour after admission, under avertin anesthesia, esophagoscopy was performed. A 1 inch pearl button was removed without difficulty from



FIG 11 (Case 9) A P film shows a button in the esophagus.

the esophagus. Following operation the patient had no reaction whatever. He complained of no further pain in the abdomen and had no vomiting. He continued to eat well. Two days later, on March 23, 1936, he was discharged improved.

*Comment*—It is surprising that a button of this size should remain so high in the esophagus for as long a period as 2 days without producing more difficulty in swallowing. Apparently the child was able to eat normally, and for this reason the mother had expected that the button had passed on down through the intestinal tract. The only symptoms were vague abdominal pains, and the failure to recover the button. The button, as is the case with esophageal foreign bodies, was found in a transverse position.

## THE VALUE OF HISTOLOGIC DIFFERENTIATION OF BASAL CELL CARCINOMAS\*

BY SHIELDS WARREN, M.D.,† OLIVE GATES, M.D.,† AND PAUL W. BUTTERFIELD, M.D.‡

EVER since the recognition of the relatively benign course of rodent or Jacobean ulcer and its differentiation as a basal cell carcinoma by Krompecher<sup>1</sup> there has been much discussion among pathologists as to the proper classification of cutaneous carcinoma other than the epidermoid and adenocarcinoma groups. It is generally accepted that the tumors arise from the basal layer of epithelial cells. However, finer subdivisions based on suppositions as to their origin from skin or its appendages have caused considerable confusion and disagreement.<sup>2,3,4</sup> It is the purpose of this study to attempt a cor-

relation of the histologic appearance and clinical behavior of these tumors.

The tentative histologic grouping used in this paper is based on a microscopic study of 2,500 skin carcinomas. The details of this study will be reported elsewhere.

Epidermoid and adenocarcinomas are not included in this study. The remaining types are divided into five groups:

- 1 Basal cell carcinoma
- 2 Basal cell carcinoma with foci of keratinization
- 3 Mixed basal cell and epidermoid carcinoma
- 4 Hair matrix carcinoma
- 5 Cystic basal cell carcinoma

The basal cell carcinoma is made up of uniformly spindle shaped cells in compact clusters which vary widely in size and architecture.

From the Laboratory of Pathology Harvard Cancer Commission and the Department of Pathology Harvard Medical School.

Read by title before the American Association of Pathologists and Bacteriologists April 10 1937.

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not exclusively characteristic of any one type

The carcinomas of definite glandular origin are not included in this study

The accompanying changes in the connective tissue surrounding the tumor such as mucoid degeneration and hyalinization, are much the same in all groups

In order to correlate the histologic structure with the clinical behavior of these tumors, the Huntington Memorial Hospital records of 321 carcinomas of the above groups, diagnosed microscopically, were studied. Three hundred and eleven tumors were taken in sequence from the hospital files. Eight patients had more than one tumor, 18 skin cancers occurring in them. Ten tumors were added to the groups of mixed basal and epidermoid carcinoma and of cystic basal

nance of males is even more marked in the tumors of the ear, where the ratio of affected males to females is 23 to 1. Lacassagne's<sup>3</sup> figures show this sex variation in exaggerated form. 80 per cent of his cases of basal cell carcinoma of the forehead occurring in females and 90 per cent of those of the ear occurring in males.

Results of treatment are based on 164 tumors from 162 patients (table 2). The remainder did not have adequate follow-up and are not included. One patient had three basal cell carcinomas of the face, each with five year cures. Only 38 per cent had lived with no recurrence 5 years or more after their last treatment. If we discard from the total the fourteen cases dying without evidence of disease less than 5 years after the last treatment, the percentage of cures

TABLE 3  
SIGNIFICANCE OF CLASSIFICATION

	Basal Cell Carcinoma	Basal Cell Carcinoma with Foci of Keratinization	Mixed Basal Cell and Epidermoid Carcinoma	Hair Matrix Carcinoma	Cystic Basal Cell Carcinoma
Average diameter at first treatment*	2.5 cm	2.5 cm	2.4 cm	1.8 cm	3.8 cm
Average duration in months to first treatment*	60	43	35	75	147
Per cent 5 year cures†	41	20	30	33	100

\*Based on 310 tumors

†Based on 164 cases as in table 2

cell carcinoma so that a more adequate number would be available for study

The first table shows the distribution of the various groups of carcinoma without the added cases. The largest proportion of tumors, 81 per cent, occurs on the face and ear above lines drawn from the angles of the mouth to the lobes of the ears. Aside from this well established preference for the upper face, the tumors are scattered irregularly over the body. There are nearly as many tumors on the neck and trunk as on the lower face. It is of particular interest to note that, in the group of 50 hair matrix carcinomas, only five are located on the most active hair-bearing areas. The different groups of tumors have no site of predilection as compared with one another.

While epidermoid carcinomas of the skin are also numerous on the upper face, 402 occurring in our series of 882, or 46 per cent, this localization is only half as frequent as in the basal cell tumors.

The sex ratio in this series shows the usual 2 to 1 predominance of affected males. The significance of exposure is well brought out in the variation of the ratio for different parts of the body. On the trunk and extremities the incidence is the same in both sexes. On the face these carcinomas are about half again as frequent among males as females. The predomi-

for the whole group rises from 38 to 43 per cent. Fifty-eight per cent of the 164 cases were first treated at the Huntington Memorial Hospital. Forty-six per cent of these were alive and well at the end of 5 years. Twenty-six per cent of the cases first treated elsewhere were alive and well at the end of 5 years. In 1919 Simmons reported 72.5 per cent "immediate cures" in suitable cases treated with radium at this hospital.

For comparison a random group of 100 skin cancers of the upper face treated by radiation alone, were studied. These cases were diagnosed clinically as carcinoma and no biopsies were taken. Thirty-seven per cent of the entire group were free from disease after 5 years. The lower percentage of cures is probably due to the inclusion of the more radioresistant epidermoid cancers with the basal cell types. Probably 38 per cent were epidermoid cancers, as in our experience that percentage of epidermoids of the upper face occurred among 2323 skin cancers. This shows about the same percentage of cures among non-biopsied basal cell cancers, clinically diagnosed, as among those biopsied. In selected favorable cases a higher percentage may be obtained.

It must be recognized that considerable improvement in radiation therapy has occurred since many of these cases were treated. In gen-

TABLE 2  
RESULTS OF TREATMENT

Type and Location	Number of Cases			Alive without Disease			Dead without Disease			Alive with Disease			Dead with Disease			Per Cent 5 Year Cures
	H	O	To- tal	H	O	To- tal	H	O	To- tal	H	O	To- tal	H	O	To- tal	
Basal cell carcinoma																
Upper face	51	43	94	22	11	33	5	2	7	10	11	21	11	19	33	
Lower face	7	2	9	4	1	5	—	—	—	—	—	—	3	1	4	
Miscellaneous	8	1	9	7	1	8	—	—	—	—	—	—	1	—	1	38
			112			46			7			21			1	41
Basal cell carcinoma with foci of keratinization																
Upper face	3	1	7	1	—	1	—	1	1	1	1	2	1	2	3	
Lower face	1	—	1	—	—	—	—	—	—	—	—	—	1	—	1	
Miscellaneous	—	2	2	—	1	1	—	1	1	—	—	—	—	—	—	4
			10			2			2			2			—	20
Mixed basal cell and epidermoid carcinoma																
Upper face	6	10	16	—	3	3	2	—	2	2	1	3	2	6	8	
Lower face	2	1	3	1	1	2	1	—	1	—	—	—	—	—	—	
Miscellaneous	1	—	1	1	—	1	—	—	—	—	—	—	—	—	—	30
			20			6			3			3			8	
High matrix carcinoma																
Upper face	13	5	18	6	—	6	1	1	2	2	2	4	4	2	6	
Lower face	1	1	2	1	—	1	—	—	—	—	—	—	—	1	1	
Miscellaneous	1	—	1	—	—	—	—	—	—	1	—	1	—	—	—	33
			21			7			2			5			7	
Cystic basal cell carcinoma																
Upper face	1	—	1	1	—	1	—	—	—	—	—	—	—	—	—	
Lower face	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Miscellaneous	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100
			1			1			—			—			—	38
Total			164			62			14			31			57	

H = First treatment at Huntington Memorial Hospital  
O = First treatment outside Huntington Memorial Hospital



patients have shown tests between 30 and 70 and with such a score, these patients have been considered as examples of myasthenia gravis. Patients showing a rate of 15 to 30 would be classed in a doubtful group and those under 15 as suffering from some other disease.

In the twenty-seven patients with other diseases, on whom twenty-seven tests were performed, the average score was only 15. All the scores were between 0 and 8 and eighteen were 0. Five were 4 and one was 8. Thus, in our series of forty-five patients on whom fifty-four tests have been done, the twenty-seven negative cases were recorded as below 8 on the diagnostic schema. The other diseases which were tested covered a wide variety of neurologic and medical conditions. Six patients had progressive muscular dystrophy, two had recurrent ophthalmoplegia, one had progressive bulbar palsy, one progressive muscular atrophy, one carotid aneurysm, two neurasthenia with congenital ptosis, two postencephalitic Parkinson's disease, one Addison's disease, and the others were a scattered group of single cases.

In nine control patients a sterile saline solution was used in place of prostigmin without any effect on the muscular weakness. In four of the positive cases the electromyograms showed the characteristic changes of this disease.<sup>2</sup>

As we have had more experience with this test certain modifications have been adopted. It is felt that a new schema should replace the old (fig. 1). In this the time interval has been put at ten and thirty minutes, one two four six and eight hours. This is an extension of time from three hours to eight hours in order to estimate the prolonged effects of the drug. In one hour or less, however, the improvement is usually pronounced enough to make the diagnosis reasonably certain. As many patients with myasthenia gravis do not have involvement of the extremities, their disease being limited to the cranial nerves, it was not always possible to use that part of the old schema devoted to Gen-

eral"—decrease in weakness of the larger muscle groups. This has now been dropped out of the schema and we record only the subjective improvement as noted by the patient and the objective changes observed by the physician in many cases confined to improvement in the function of the cranial nerves. The new point total is 56. On this basis the average test on eighteen patients was 30. In conditions other

Elapsed Time Following Injection	Objective Improvement in Muscular Paralysis	Subjective Improvement in Muscular Paralysis
10 mins	3	2
30	4	4
1 hr	4	4
2 hrs	3	4
4	2	2
6	0	1
8	0	0
Total		33 points

FIG. 1. The Prostigmin Test. Method: 3 cc. (15 mg.) prostigmin (Roche) 1:2000 solution plus atropine sulphate gr. 1/160 intramuscularly. The typical response in a case of myasthenia gravis.

than myasthenia gravis it was 1. This new schema will not in any way change our essential ideas about the value of the test. Secondly, we have adopted intramuscular injections of prostigmin for the test in place of the previously used subcutaneous injections, as the effect is greater, quicker and longer by this method.

In conclusion, it should be pointed out that the profound change in muscular action under the stimulation of prostigmin in patients with myasthenia gravis and the absence of this change or its relative slightness in other diseases give us a valuable test for myasthenia gravis. A simple way of recording the results has been delineated.

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## TREATMENT OF DELIRIUM TREMENS WITH SODIUM EVIPAL

BY PERRY SPERBER, M.D.\*

LACK of a specific therapy for delirium tremens led me to experiment with various drugs in the hope of possibly finding one capable of terminating abruptly this alcoholic syndrome. The success obtained with sodium evipal has prompted this report. There was no reason to suppose that sodium evipal would solve the problem. Either it would produce its usual twenty minute anesthesia as when given intravenously to produce surgical narcosis or else it

would add its name to the list of a host of other drugs that failed.

This work was carried out at a large Eastern penitentiary where several hundred alcoholics are admitted every year. Most of these men are chronic addicts and have served more than one term in prison for alcoholism.

A considerable number are seen by the physicians because of such complaints as nervousness, irritability, insomnia and tremors. Sedatives are administered, such as paraldehyde, bromides or one of the barbituric derivatives. The

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erial, the cases irradiated were given one treatment with radon, ranging from 15 to 200 mc hours in glass or steel tubes at a distance of one centimeter. The larger lesions were usually given a second treatment. Recurrences were treated in similar manner. Gold seeds were sometimes implanted. Occasionally low voltage x-rays were used in hopelessly advanced cases.

In table 3, differentiation, size, duration and end results of the different tumors are correlated. Deductions must be drawn cautiously, as the series is small. However, the size of the lesion at first treatment and the duration to first treatment are based on 310 cases and so deserve some consideration. The two types approaching the epidermoid, the basal with foci of keratinization and the mixed basal cell and epidermoid, were of shorter duration than the others and gave poorer results. The relatively large size of the lesions when first treated accounts to some extent for the fewer cures in this series as compared with published data.

The slowly growing hair matrix carcinoma tends to form histoid structures. The prominence of melanin in these tumors also suggests the organoid tendencies of these more slowly growing carcinomas. The basal cell carcinoma without any definite tendency to structural development has slightly more active growth, but is closely allied to the former group. Unfortunately the group of cystic basal cell carcinomas is too small to be considered, though their large size and long duration are of interest.

One questionable instance of metastasis was encountered. This was a male of 64 years with

a slowly growing hair matrix carcinoma of the inner canthus which was excised. Two years later a mass in the neck on the same side was biopsied and showed a highly malignant, non-classified tumor. This probably represented a different cancer rather than a metastasis. Since metastasis is not a factor and local recurrence is frequent, the low percentage of cures hinges on inadequate therapy.

#### CONCLUSIONS

1 The origin of basal cell carcinomas whether from skin or appendages, is of no clinical significance.

2 The form of differentiation indicates the degree of malignancy, differentiation as a basal cell tumor or hair matrix tumor indicates low malignancy, while differentiation toward epidermoid carcinoma is present in the more malignant tumors.

3 Biopsy of all skin tumors is essential for the establishment of rational treatment of skin carcinomas.

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## THE PROSTIGMIN TEST IN MYASTHENIA GRAVIS\*

### Second Report

BY HENRY R. VIETS, M.D.,† AND ROGER S. MITCHELL, M.D.†

IN December, 1935, Viets and Schwab reported upon the value of prostigmin in the diagnosis of myasthenia gravis.<sup>1</sup> Five patients with myasthenia gravis were tested and, in addition seven patients with other diseases simulating the myasthenic syndrome. A diagnostic schema was developed in order to tabulate the findings. After subcutaneous injection of 15 mg. (3 cc. of a 1/2000 solution) of prostigmin with atropine, grains 1/100, the patient was observed at the intervals of ten, twenty and forty minutes and one, two and three hours. An estimate was made in three categories—(1) "Subjective", relating to an increase in a general feeling of well-being on the part of the patient, (2) "General"

indicating a decrease in paralysis of the larger muscle groups, such as those subserving grip, station and walking, (3) "Local", the objective findings in the smaller muscle groups, such as the extraocular muscles, those of the face, and the muscles used in talking and swallowing—on a scale of 0 to 4, 0 indicating no change, 1 slight, 2 moderate, 3 marked, and 4 complete change. The schema was made up with a possible total of 72.

We have now tested eighteen patients with myasthenia gravis, using the test twenty-seven times. There have also been tested twenty-seven patients with other diseases, one test being used on each patient. Of the positive cases, in the twenty-seven tests with a possible total point score of 72, the average has been 52. The lowest test was 17 in one case, but the next lowest was 32. The highest was 70. In general, the

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lapsed into a state of unconsciousness another cubic centimeter was injected. This man slept for two hours awoke for a very brief interval, and then fell into a deep sleep that lasted for eighteen hours. Upon awakening he was fully oriented. There was no memory of the attack. No sign of the delirium tremens returned after the original induction of narcosis.

CASE 3. A white male aged 52 years was admitted to the hospital exhibiting the symptoms of delirium tremens as in the above cases. The same technic was utilized. Two cubic centimeters of 10 per cent sodium evipal were injected intravenously. Upon visualizing the induction of anesthesia another cubic centimeter was introduced. The patient slept for two and a half hours. He awoke for a very brief interval and then went to sleep for twenty-one hours.

When he awoke he was perfectly oriented and like the others could not recall the syndrome. A recurrence of symptoms did not occur.

Unfortunately I was unable to continue these experiments. Three cases constitute a very small series, yet I feel it incumbent upon myself to report the cases.

Ordinarily delirium tremens lasts from two to ten days with an average of five days. The sleeplessness which marks this period is followed by a deep sleep which continues without interruption from twelve to thirty hours. The patient upon awakening is sensible, free from hallucinations and correctly oriented. There is never complete remembrance of the syndrome although some details can be recalled.

It can hardly be considered accidental when sodium evipal aborted three typical delirium tremens attacks. No other drug has done this in even one case. Evipal seems to have a specific action on the nerve centers involved. Ordinarily it acts for twenty minutes. In these cases it induced a sleep lasting for a period of two to four hours. This was followed by a deep sleep which persisted for eighteen to twenty-four hours. This latter period is not due to the drug but is the natural sequence of delirium. The patient catches up on his "sleep debt" as a result of exhaustion from the ordeal.

Uncomplicated delirium tremens has a 15 per cent mortality. If it is associated with such infectious diseases as pneumonia the outcome is apt to prove fatal. Following trauma it produces a 50 per cent mortality. The discovery of an abortifacient for an attack of delirium

tremens would mean the saving of many lives every year. The results in this small series of patients suggest that the intravenous injection of sodium evipal may be a specific remedy. Positive conclusions can be drawn only from a large number of trials.

The observations are passed on to those of the medical profession who are engaged in the treatment of alcoholic victims. It should be interesting to see whether the drug will live up to its present apparent effectiveness. Furthermore if it is found to be successful it should be tried to see whether it will prevent the syndrome when administered in the predelirium state and whether it will exert a similar abortifacient action in acute alcoholic psychosis.

SUMMARY

Drug therapy in the past has failed completely to control delirium tremens let alone abruptly terminate it. The mortality is 15 per cent in uncomplicated cases, 50 per cent when it occurs following trauma and even higher in the course of certain infectious diseases.

Sodium evipal immediately after intravenous injection in ordinary therapeutic doses aborted the attack in three typical cases. The patients fell asleep for a period of two to four hours. At the end of the initial period of sleep they awoke for a very brief interval, then returned to a deep sleep, the latter being the usual reaction following the natural ending of an attack of delirium tremens. On awaking, all were fully oriented and had no recollection of the attack. At no time was there a recurrence of symptoms.

The observations suggest that sodium evipal may be a specific remedy for delirium tremens and this small series of cases is reported in the hope that its true value will be determined by others. Its possible value as a preventive in the predelirium state and as an abortifacient in acute alcoholic psychosis is suggested.

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most satisfactory seems to be a combination of the triple bromides, grains 20, with phenobarbital, grains 3. This is repeated if needed. A small percentage, in spite of vigorous medication, go on to develop delirium tremens.

Once the syndrome is fully evident I have failed to see it stopped by any form of medication. The treatment is really one of watching, waiting and supportive measures until the attack runs its course or terminates in a complication.

The old textbook stand by paraldehyde, is useless. Patients may be literally saturated with it by the intravenous route in large repeated doses and still show no regression of symptoms. The only visible effect is a short paroxysm of dyspnea. The oral administration is equally ineffective. In some patients paraldehyde may actually intensify the delirium.

Morphine even in large doses is valueless. It does not alter the course of events in the least. Some authorities believe it to be harmful saying that it adds to the cerebral edema already present.

Alcohol in the form of whiskey is both condemned and praised as a therapeutic agent. There are physicians who combine the whiskey with paraldehyde, first giving whiskey followed after an interval by paraldehyde. They feel that the period of the delirium is thereby shortened. Others are inclined to think that alcohol has no effect whatsoever and, for that reason is useless to give. Some holding a still more pessimistic viewpoint say that the giving of whiskey to a delirium tremens patient is actually deleterious and the worst possible therapeutic procedure.

Various barbituric acid derivatives have been used for the control of the convulsive or excitement states that accompany certain neurologic and psychiatric disturbances. Meiloo<sup>1</sup> states that barbituric acid compounds have a specific sedative action on epileptic convulsions and Cline and Coleman<sup>2</sup> have used phenobarbital sodium intravenously in severe cases of delirium tremens which could not be controlled by paraldehyde. Evipal has been recommended by Kuntze<sup>3</sup> for quieting greatly excited psychiatric patients, but no reference to its specific use in patients with delirium tremens can be found in the literature. Many other drugs have been utilized at different times. Among them are chloral hydrate, the bromides, strychnine, apomorphine, ergot, nuxvomica and hyoscine. None of these, however, will abort an attack.

In the wards of a prison or a large charity hospital, a delirium tremens patient is a serious problem. Where quiet is necessary, they are a distinct nuisance. At night they keep the ward awake. A physician is taxed to handle these people. It was in one of these episodes that I determined to try sodium evipal feeling that if

I could produce a twenty-minute anesthesia some of the ward patients would be able to fall asleep in the interim.

#### RESULTS OF EVIPAL THERAPY

The cases described below were all those with a fully developed delirium tremens. In each instance the patient had failed to respond to preliminary medication.

#### CASE REPORTS

**CASE 1** A white male aged 40 years was admitted to the hospital in an active state of delirium, muttering and disoriented. Typical tremors were present. The tongue was furred. Hallucinations were of the visual variety. The patient remained afebrile. His past prison record and the general physical examination indicated a longstanding chronic alcoholism.

Restraints in the form of sheets were applied to keep the patient in bed. They were arranged about the shoulders, wrists and legs, restricting the man but allowing moderate body movements.

It was decided to try sodium evipal on this case. The solution used was prepared in the usual manner by dissolving 1 gram in 10 cubic centimeters of sterile distilled water, thus producing a 10 per cent solution. It was necessary to have six men hold the patient reasonably still so that the injection could be given. Assuming the man to be right handed the left arm is the site of choice for the intravenous therapy. The reason is simply that it is a little easier to restrain the less muscularly developed extremity. One man held the hand at the wrist. A second controlled the forearm at the elbow and a third prevented movements at the shoulder. The other attendants controlled the legs and opposite side of the body. Body and arm restraint is the most important part of the technique, for a wildly delirious patient with a needle in his vein can inflict damage to the vein and soft tissues of his arm. Furthermore one cannot inject an intravenous solution slowly into a motile shifting arm.

Two cubic centimeters (0.2 gram) were injected slowly. Suddenly the patient stopped his mad struggling and relaxed. He yawned lazily and then dropped off into a deep sleep. Another cubic centimeter (0.1 gram) was injected. I was amazed to see this struggling man sleeping so peacefully where a moment before six men were using all their force to try to restrain him. Gone were the tremors, muttering delirium and hallucinations. He was like any other patient under evipal narcosis. The bounding pulse returned to normal. The respiratory rate became normal. The intense sweating stopped. He was wiped dry and light blankets were applied.

I was surprised to see the anesthetic take hold but was more anxious to see what would happen after the twenty minute narcosis time had elapsed. The time interval passed. He continued to sleep. After four hours the patient awoke for a brief time and asked for a drink of water. The psyche was dulled. He drank the water and then went off into a deep sleep from which he emerged twenty-four hours later. He had no recollection of the attack and was fully oriented and sensible. At no time was there a return of symptoms.

**CASE 2** A white male aged 45 years was admitted to the hospital in a state of delirium tremens similar to the above. The same technique was used. Two cubic centimeters of 10 per cent sodium evipal were injected intravenously and after the patient

below its junction with the femoral vein,<sup>3</sup> together with the sectioning and ligating of all tributaries joining either the femoral or saphenous at that junction (figs 1 and 2). The purpose of ligating all the tributaries at the sapheno-femoral opening is to prevent any reestablishment of the long saphenous vein through the enlargement of some collateral from such a tributary. It was the neglect of this latter detail

pressure from the femoral vein causes either a recanalization of the partially sclerosed vein or a detouring around the sclerosed portion. Neglect or inability to accomplish fully this destruction has been the cause for recurrence of varicosities following the injection method.<sup>1 2</sup>

With this information in mind and realizing that injection is an office procedure entailing no disability and probably only slight abhorrence

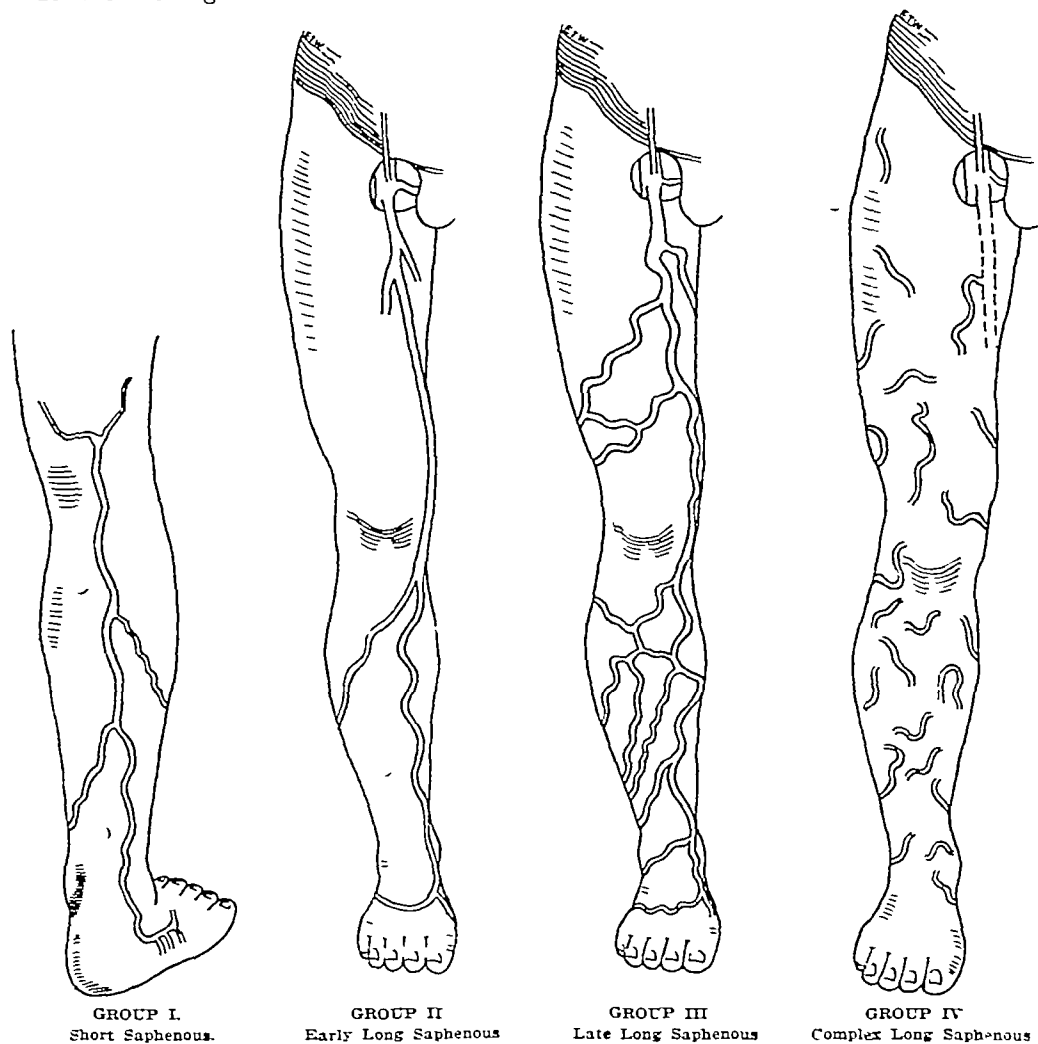


FIG. 3

which probably caused the recurrence of varicosities following the operation of tying and stripping<sup>4</sup> and may also be the reason for failures following some present day ligations.<sup>1 2</sup>

The term, injection, means the introducing of a sclerosing solution into a varicosity. The purpose of injection is to obliterate the vein. To be successful, it is necessary that all of the varicosity be destroyed right up to the first competent valve above the diseased portion. If there is no such competent valve, then the destruction must be carried up to the sapheno-femoral opening, otherwise, the reverse venous

on the part of the patient, whereas high ligation is an operation entailing more or less disability for several days\* and is accompanied by considerable abhorrence, we formulated a definite rule to govern the choice of treatment at the Boston Dispensary. This rule reads as follows: *if adequate injection is possible inject otherwise, ligate*

The problem was to ascertain which cases

At the Boston Dispensary patients enter in the early morning are operated upon before noon and are discharged in the afternoon or at the latest the next morning. If the ligation is bilateral they remain in the hospital until the next morning, routinely. They are encouraged to walk immediately or shortly after the operation in order to prevent embolus formation but there is some soreness in the groin for a few days.

## THE MANAGEMENT OF PATIENTS WITH VARICOSE VEINS\*

BY EDWARD T. WHITNEY, M.D.,† AND PETER A. CONSALES, M.D.†

CONSIDERABLE confusion regarding the choice of procedure in the treatment of varicose veins exists at the present time. The current literature abounds with articles on the "ligation operation" for varicosities while results with new sclerosing solutions continue to be reported. Whether to perform preliminary ligation on all or only on selected cases or whether merely to inject every case is a question that naturally arises whenever a case of varicose veins is presented for treatment.

Ten years ago the only methods at our disposal for correcting venous stagnation in the lower extremities were supportive bandages and stockings, elevation and rest or radical surgical excision of the veins. However, when it was found that the same end could be achieved by injecting a sclerosing or obliterating solution into the vein, it was not long before such an ambulatory procedure became popular. But injections did not turn out to be wholly successful as sloughs occurred quite frequently, especially in the hands of the inexperienced. A bewildering array of sclerosing solutions soon appeared all of which were occasionally followed by some form of general reaction, and the choice between single or multiple injections increased the confusion. In addition, experience soon revealed that recurrence was a fairly common thing no matter what solution or method was used.<sup>1,2</sup> In order that this latter possibility might be prevented, ligation of the long saphenous vein at the sapheno-femoral junction was proposed.<sup>3</sup> This procedure complicated the picture still more as it caused the pendulum to swing back to operative procedures again.

This state of confusion has not been confined entirely to the practitioner treating an occasional case, for several large established clinics have closed their varicose vein departments only to reopen them again under some new system or regime.

The vein department at the Boston Dispensary was established eight years ago and has remained in constant service ever since. During these years newer methods, solutions and technique have been adopted and in many instances, modified but no accepted procedure has been discarded unless it was definitely supplanted by measures that proved to be more successful. Furthermore, as the Boston Dispensary is self supporting, we had only an occasional free bed at our disposal, so that our patients had to be kept

ambulatory if possible. As a result, we have had to check our failures and successes carefully in order that we might anticipate the case that would require hospitalization and the case that could be kept ambulatory. This restriction has been of tremendous benefit to us because, as a result of it, we are now able to select in advance the particular method of treatment best suited to obtain a cure.

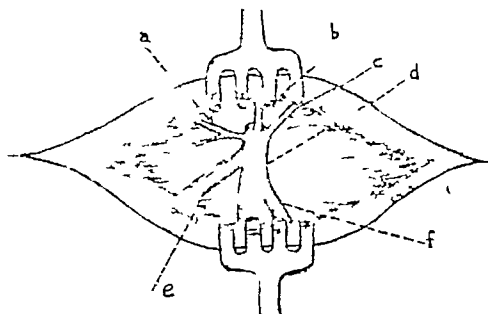


FIG 1 A composite picture of all the possible tributaries to be found at the sapheno-femoral junction. (a) Superficial external pudendal (b) Superficial epigastric (c) Superficial circumflex iliac (d) Long saphenous (e) Internal superficial femoral (f) External superficial femoral

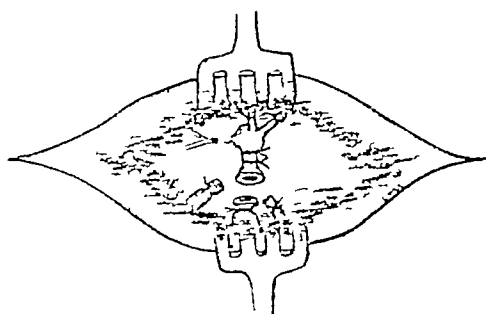


FIG 2 Same as fig 1 with all veins ligated

Before we were able to select our cases, however, it was very necessary to know just what any particular procedure sought to accomplish and how that end was achieved. We therefore studied the whole question from the point of view of anatomy, pathology, theory and experience. It appeared that there are or have been three general methods of treatment for varicosities, namely, radical excision, ligation and injection. There may be modifications or combinations of any two of these methods.

Naturally, radical excision is to be avoided at all times and should no longer be considered a form of therapy, not because it is replete with recurrences, but because there appears to be no great advantage in doing a radical operation when the same result can be attained by more conservative measures.

The term high ligation, means the sectioning and ligating of the long saphenous vein just

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FIG 4 Picture of a Group I case (short saphenous). The sapheno popliteal opening is indicated by the arrow. There were no varicosities of the long saphenous vein. Note the small tributary coming down the external aspect of the thigh.



FIG 5 Picture of a Group II case (early long saphenous) a typical location for varicosities of the long saphenous vein. There was no positive Trendelenburg test. The line in the thigh indicates the location of a fluid wave up the vein which should be injected in order that a later development of a Group III condition may be prevented.



FIG 6 Another Group II type (early long saphenous). This is a branch of the long saphenous vein, starting in the thigh and running down the external aspect of the leg. It is called the external superficial femoral vein. No other part of the saphenous system was varicose and a tourniquet placed above its junction with the long saphenous vein revealed the absence of a positive Trendelenburg test.



FIG 7 A Group III case (late long saphenous). Note that the whole varicosity can be followed or mapped out on the leg. The Trendelenburg test was positive.

could be *adequately* injected and which cases could not. To simplify this problem we divided all varicose conditions into four groups (figure 3), according to their "topographical" pathology, as follows

GROUP I Short saphenous See figure 3 (I)

Varicosities restricted exclusively to the short saphenous vein are quite common, especially in the young. This vein runs up the posterior, external aspect of the calf to the popliteal space and usually has small tributaries coming down the thigh or from about the knee. It anastomoses with the long saphenous vein especially by way of one of the superficial femoral veins, but when this latter vein is also varicose the case is considered under Group II or III.

GROUP II Early long saphenous See figure 3 (II)

This group includes varicosities of the long saphenous system not showing a positive Trendelenburg test. The absence of a positive Trendelenburg test indicates that the sapheno-femoral valve is still competent and that the disease is confined to the vein below the level of this valve.<sup>†</sup> As a general thing only a few branches are involved and they are moderately dilated and are not under great tension.

GROUP III Late long saphenous See figure 3 (III)

The only difference between Group II and Group III is the presence of a positive Trendelenburg test in the latter and its absence in the former group. This indicates that the sapheno-femoral valve is incompetent and that it is allowing a back-flow of blood from the femoral vein into the saphenous. All of the varicosities of the long saphenous vein and its branches show continuity, that is, they can be followed or definitely mapped out on the leg. Usually the varicosities are greatly distended and are under marked tension. The short saphenous vein may be involved as well.

GROUP IV Complex long saphenous See figure 3 (IV)

This group is distinct, it is not a late manifestation of Group III or at least only in part. It is usually seen in fat legs that, in addition, are quite edematous. The varicosities can be seen or felt beneath the skin for a short distance only, because they then dip down and disappear in the fat or deep tissues. No definite continuity of compo-

nent parts can be made out, such as can be done in Group III. It is often difficult to determine whether the Trendelenburg test is positive, but it usually is, thereby showing that the sapheno-femoral valve is also diseased. In some of these cases a double Trendelenburg condition can be demonstrated, showing that some of the perforators are incompetent as well.

In looking over these groups from a theoretical viewpoint some of them automatically indicate whether adequate injection is possible and so suggest which particular procedure is best suited to obtain a cure. Obviously high ligation is not necessary in Group I (short saphenous), because the long saphenous vein is not involved. In Group II (early long saphenous) a few injections will adequately destroy any diseased portion of vein.<sup>‡</sup> If, later on, the thigh portion of the saphenous vein and its protecting valve become diseased, then a positive Trendelenburg test will develop and this automatically changes the classification into that of Group III.

If all portions of a Group III case (late long saphenous) can be seen or felt and if obliteration by injection can be made right up to the sapheno-femoral opening, then a cure by injection is possible, but many cases will be found to be noninjectable, simply because somewhere in the thigh the long saphenous vein disappears in the deeper tissues and cannot be found even by percussion of the fluid wave. Obviously, in such cases high ligation is necessary to prevent recurrence.

Group IV (complex long saphenous) cases cannot be obliterated completely because long portions of the diseased veins have disappeared in fat and cannot be reached by the sclerosing fluid. High ligation is definitely indicated in those showing a positive Trendelenburg test<sup>§</sup> and even further surgery may become necessary in those with a double positive Trendelenburg test. De Takats<sup>2</sup> considered that 4 per cent of his cases required radical excision, while we have adopted Cooper's<sup>6</sup> suggestion of multiple ligations to control such cases.

In order to ascertain whether these theoretical considerations had been obtained in practice we conducted a follow up examination. Out of about 1000 patients that had received injection treatment at least two years previously only 113 had records sufficiently comprehensive relative to the location of the varicosities and to the Trendelenburg test, for us to classify them according to our "topographical" groups.

<sup>†</sup>The etiology of varicose veins is still in a state of confusion. It has not been proved whether the destruction of the walls of the vein or the destruction of the valves of the vein is primary. Practically it does not make much difference. We do know that disease of some kind is weakening both the vein walls and the valves. This weakening may be local or it may include the whole vein right up to its junction with the deep system.

<sup>‡</sup>If one thing, we found it much more difficult to make the cured cases come in for examination. Consequently these figures are distorted in that we had more recurrences than our available records for classification. Secondly our records were not sufficiently uniform or comprehensive to allow classification of all cases at the time of re-examination, especially if there had been a lapse of some years since treatment. This further reduces the number of available cases. Thirdly as we have mentioned before many patients failed to continue treatment until a cure was obtained. As a result they are classed as recurrences when really they might have been cured.



saphenous vein is impossible. These are the cases in which ligation has been a conspicuous success.

No general rule can be followed in the treatment of Group IV cases. Ligation alone will not cure, although it is indicated where there is a positive Trendelenburg test. Injections alone will not cure, nor will a combination of injections and simple high ligation.<sup>8</sup> In our cases, after high ligation, we inject comparatively large amounts (15 to 20 cc) of a combined saline and sugar solution into all available varicosities in an attempt to thrombose the deeper unavailable portions. If these injections are not successful, it is almost certain that the perforators are incompetent or, in other words, that there is a double positive Trendelenburg test. In such a case a search is made for the locations of these perforators by either the Ochsner<sup>9</sup> or Cooper<sup>8</sup> test, and, if they can be found, multiple ligations<sup>8</sup> accompanied by simultaneous injections are made at these points at weekly or fortnightly intervals.<sup>5</sup>

There is really a Group V, which, for the sake of simplicity, we have not mentioned before. This group includes all cases that present special problems requiring further study before either ligation or injection can be recommended. All patients with any generalized or local conditions that might result in either a mortal or morbid accident following or coincident with an operative procedure fall into this group. We might mention some examples, such as, extreme hypertension and arteriosclerosis, extreme age, early or potential thromboangitis obliterans and all cases giving a history of previous deep phlebitis with persistent signs of either venous or lymphatic blockage.

#### SUMMARY

The present-day confusion concerning the treatment of varicose veins is the result of the

A full report of a series of Group IV cases treated by multiple ligation and injection will be published later. We are confident that such a procedure will accomplish as much or more than radical excision would in such cases.

#### DO YOU KNOW?

The first bifocal eyeglasses were invented by Benjamin Franklin.

Homicides and suicides are decreasing with the improvement of economic conditions but fatal accidents are on the increase.

The first ambulance service was started in June 1869 by Bellevue Hospital New York City under the direction of Dr. Edward B. Dalton.

Athlete's heart is supposed to be an ailment resulting from active exercise. There is no evidence that a healthy heart is harmed by athletic activities.

rapid progress made in the field during the past ten years.

It is now a question of whether to ligate all varicosities, whether to ligate only selected cases or whether simply to inject.

We have answered this question by formulating and adopting the following rule: *if adequate injection is possible, inject, otherwise, ligate*.

In attempting to carry out this rule we have found it helpful to divide all varicosities into four groups based upon their topographical pathology and upon the presence or absence of a positive Trendelenburg test.

Theoretically, adequate injection is possible in Groups I and II, while high ligation is indicated in Group III and a combination of most every available measure becomes necessary in Group IV.

Reexamination of 113 previously injected cases seemed to confirm these theoretical considerations, while classification of 343 new cases showed that approximately 35 per cent of all varicosities fell into Groups I and II, which are curable by injection, that 56 per cent fell into Group III, in which ligation is indicated and that 9 per cent more fell into Group IV, requiring even more intensive treatment.

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Good posture is a sign of self respect, besides being conducive to health.

Each of the billions of red blood-cells in the body contains, besides life-giving oxygen a charge of electricity. Two scientists of the Biological Laboratory at Cold Springs Harbor, Long Island, have measured this charge. The electricity of the blood-cells of a full grown man, they found, would light a twenty five watt bulb for five minutes.

Shakespeare said: They are as sick as surfeit with too much as they that starve with nothing.—*Excerpts from the Bulletin of the New York State Medical Society*

However, of these 113, it was found that 81 (71 per cent) showed recurrences, and these recurrences could be classified according to our groups as follows

Group	Number	Per cent	Average number of injections
I	—	—	—
II	8	9	3.3
III	60	75	11.1
IV	13	16	24.0
	81	100	

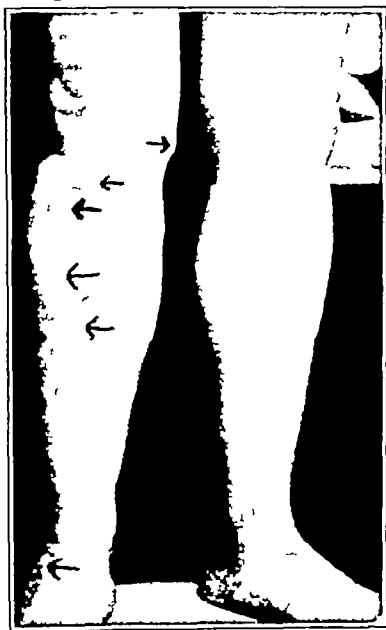


FIG. 3. A Group IV case (complex long saphenous). The affected leg was much larger than the other. The varicosities appeared only at the points marked by the arrows and yet the Trendelenburg test was positive. The vein could not be found in the thigh even by percussion. Obviously injections would be totally inadequate.

There were 32 cured cases that had records sufficiently comprehensive for us to determine at the time of reexamination in which group they belonged before they were injected. These cases showed the following classification

Group	Number	Per cent	Average number of injections
I	3	9	5.6
II	10	31	6.6
III	19	60	19.3
IV	—	—	—
	32	100	

If an analysis of both of these tables is made and the results reduced to the simplest possible terms, it will be seen that

100% of Group I were cured,  
55% of Group II were cured  
24% of Group III were cured  
0% of Group IV were cured

Of course these figures do not show whether failure was due to negligence on the part of the patient or to inadequate injection. They do, however, confirm our previously made hypothesis that adequate injections should cure Groups I and II, that a certain percentage of Group III cases can be so treated with success but that all of Group IV cases and some or most of those in Group III are failures by the injection method. Furthermore, the figures under "average number of injections" indicate that, as a part of success by the injection method, a sufficient number of injections must be made. Examination of these figures show that the average number of injections in our cured cases were practically double the number in the failures. For example, the Group II cases that were cured had an average of 6.6 injections, while the recurrences in this group were injected only 3.3 times. The cured Group III cases had an average of 19.3 injections, while the recurrent ones had only 11.1. On the other hand, many of the Group IV cases had from 40 to 50 injections and yet no cures were obtained.

The variable factors in the above figures were too numerous for us to use the latter to make observations as to how varicosities in general classify according to our "topographical" groups, but we have been able to draw some such conclusions from the figures obtained after we had examined 343 new cases as they came into the clinic during the past year. These cases showed the following classification

Group	Number	Per cent
I	21	6
II	101	29
III	189	56
IV	32	9

If these latter figures are applied to our previously made conclusions, it will be seen that approximately 35 per cent of all varicosities (Groups I and II) can be cured by injection, that about 56 per cent (Group III) ought to have high ligation, although a cure by injection is possible in some of them, and that 9 per cent (Group IV) must have surgery of some kind.

Our routine practice is simple. Each new patient, after a general physical examination, is classified according to the topographical pathology of the varicose condition. Those falling into Groups I and II are promptly injected either by the single or multiple method. If it is possible to inject the thigh portion of the long saphenous vein, this is done, otherwise, each case is followed up at definite intervals and, if the disease seems to be spreading, more radical measures are undertaken.

Patients having Group III varicosities are persuaded to undergo high ligation, if possible, and such an operation is insisted upon wherever adequate injection of the whole of the long

M A 103 1841, 1934) investigated the incidence of intestinal tuberculosis and its relation to pulmonary tuberculosis. They found ulcerative intestinal tuberculous disease, mostly in fibro-ulcerative cavernous pulmonary tuberculosis. Tuberculous enteritis was so confined to this particular group that he doubts if there is intestinal ulceration without pulmonary ulceration. He found it more frequently in women of the Negro race between 20 and 40 years of age. Primary hyperplastic tuberculosis or tuberculoma of the bowel was not observed in any case.

Mayer, E (*Am Rev Tuberc* 32 294, 1935) discusses the controlling factors in the production of cavities of the lungs. He accepts two factors in this process: first, a pathologic one which causes destruction of the lung tissue, and secondly, the added mechanical factor, traction or pulling on the diseased area which increases the size of the cavity or at least holds it open. He concludes that both tissue destruction and mechanical overstretching may tend to increase the cavitation. There may be present a reparative tissue process which tends to heal the cavity which is opposed by the mechanical tension which acts to keep the cavity open. On the other hand, there may be some emphysema in the surrounding lung tissue which relieves the overstretching and thus tends to promote the reparative processes.

Coryllos, P N (*Am Rev Tuberc* 33 639, 1936) maintains his theory as to the formation and closure of cavities. The important factors in the formation of cavities, in his opinion, are open bronchial outlets. He thus explains the mechanism of the changes occurring in the size of these cavities as being due to the physiologic exchanges of gas and of gas absorption. According to him the cure of the disease, or rather, its change from a progressive and active stage to an arrested and inactive one is based upon the biologic needs of the tubercle bacillus for large amounts of oxygen necessary for its life and growth. Thus he concludes that the development of fibrosis in the diseased lung is caused by the lack of oxygen which follows atelectasis and lack of circulatory blood in the diseased parenchyma.

Badger, T L and Meyers, W K (*New Eng J Med* 211 241, 1934) studied the relationship of tuberculin sensitivity to the activity of tuberculous disease. Their findings showed that quantitative tests as to tuberculin sensitivity bear no relation to the degree of activity or inactivity of the tuberculous lesion.

Kaminsky, J (*New Eng J Med*, 24 245 1934) reports on the leucocytic picture as an aid in the measurement of activity in pulmonary tuberculosis. In a study of 356 admissions at Middlesex County Sanatorium in Massachusetts, the leucocytic picture was found to be of real value in estimating activity. He states that

when there is a discrepancy between the blood picture on the one hand and the clinical and roentgenographic findings on the other, the former should be regarded as the more reliable index of activity.

(All of this needs still further study. J B H—M J S)

Muller, G L and Davidson, D (*New Eng J Med* 211 248, 1934) find that the monocyte lymphocyte ratio in tuberculous individuals has no diagnostic value. In a group of patients with normal or nearly normal m-l ratios, many were definitely active as indicated by toxic clinical symptoms and many showed an increased sedimentation rate with a shift to the left in the polymorphonuclear differential count. They conclude therefore, that the monocyte lymphocyte ratio is not a reliable index of activity in tuberculosis. They add, however, that it does give a valuable indication as to how the individual is handling his infection, an increase in monocytes indicating a losing fight, a decrease in monocytes showing the reverse. It is thus of prognostic value.

Thiele, G (*Beitrag zur Klin d Tuberk* 85 302, 1934), in a study of 600 patients, endeavored to correlate the sedimentation test with prognosis. He found that patients who had a sedimentation rate of more than 51 mm in the first hour showed 75 per cent mortality during the observation period, patients with the rate of 31 to 50 mm had a mortality of 41 per cent, those with a rate of 11 to 20 mm a 16 per cent mortality. It was particularly in those patients who had undergone operative treatment that a return to a normal sedimentation rate was indicative of an excellent prognosis.

Ordway, W H (*New Eng J Med* 211 260, 1934) points out the necessity of using all available methods in the evaluation of activity in pulmonary tuberculosis. He found the sedimentation test to conform rather closely with clinical indications of activity, but that in the early stages it was definitely of less value than serial roentgenograms. He pointed out that x-ray must be relied on almost exclusively to diagnose small rather acute lesions especially in young adults.

Morris, W H and Wilson, G C (*Am Rev Tuberc* 33 66, 1936) made a comparative study of differential blood counts during clinical activity and after clinical arrest of the disease. In the counts made while the patient was clinically active 86 per cent were unfavorable but 13.8 per cent showed a relatively normal picture. In 200 patients who were able to work one year after discharge, 49 or 24.5 per cent had an unfavorable blood picture and 75.5 per cent had a favorable blood picture.

Medlar, E M (*Am Rev Tuberc* 33 473, 1936) made a comparative study of 200 consecutive leucocytic counts on 50 cases of mod-

## MEDICAL PROGRESS

## PROGRESS IN TUBERCULOSIS, 1935-1936

BY JOHN B. HAWES, 2ND, M.D.<sup>\*</sup> AND MOSES J. STONE, M.D.<sup>o</sup>

A PERUSAL of the literature on the subject of tuberculosis in the past year shows very little that can be called real progress. Progress in medicine, at best slow, is not always a steady, gradual, yearly advance. Granted, then, that during the past year no striking changes have been made, the last decade will be remembered for the rapid strides both in the field of early diagnosis and of therapeutics, the outstanding features of which may be summed up as the recognition of roentgenography as an aid in early diagnosis and of collapse therapy as an important adjunct to the general treatment of tuberculosis. Both of these features have now passed the controversial stage and have been generally accepted.

In the past year we note more and more the aggressive attitude of the tuberculosis agencies, voluntary and official. No more do we discuss the early diagnosis of this disease but, rather, discussion centers more on how to reach out and find the early cases of tuberculosis so as to institute treatment when it can do the most good. The tuberculosis survey is recognized as one of the best means of accomplishing this. This year has been marked by the number of surveys in various communities to which recognition has been given as valuable public health measures. With the rapid decline in the death rate, search for early tuberculosis in the general population is now feasible by this means. Although surveys have been made for many years their practical application has been greatly emphasized during the past year.

Progress has also continued in the laboratory. Blood studies continue to be looked upon as aids in determining the progress and prognosis of this disease. Thus with the aid of the laboratory, therapeutic collapse therapy may now be more intelligently applied.

## PATHOLOGY AND LABORATORY STUDIES

Opie, E. L. (*Am Rev Tuberc* 32 617, 1935) summarizes our present-day concepts of tuberculous infection and disease. As to primary infection and reinfection he feels that there is no general agreement concerning the criteria upon which this distinction can be made. What one authority may look upon as the continuation of a first infection may be regarded as an adult infection by another. Opie feels that, since

the relation of the first infection to the adult type of disease is still under discussion, it is inadvisable to designate the latter as a reinfection. He states definitely that calcified scars of lesions have little potential significance and when unassociated with more significant changes he feels that they require no special treatment. As to the relation of the first infection or childhood type of tuberculosis to the adult type, he finds no definite consensus among workers in this field concerning this. There is still considerable discussion in regard to the relative frequency of endogenous and exogenous infection of adults. The factors of race, heredity and nutrition are still in the controversial stage. He feels that tuberculosis of human races is profoundly influenced by habits, crowded living conditions, poverty and many other factors.

Amberson, J. B., Jr. (*Am Rev Tuberc* 33 269, 1936) discusses the process of resolution in pulmonary tuberculosis. He finds that lesions which resolve are mainly the exudative pneumonic lobular or lobar types. They usually develop caseous cavities. Tuberculous exudate in the alveoli which does not resolve or caseate may become organized. He finds that resolution of early pneumonic lesions may be definitely favored by proper treatment which should include as a preliminary, two or three months or more of strict bed rest. The number of rales may increase during resolution due to better aeration of the alveoli. He claims that even calcified caseous residues may break down after many years of quiescence although this is infrequent. He makes the observation that rules which are not directly related to the tuberculous process may persist for many years in lungs in which resolution has occurred.

(This last observation is an important one J. B. H.-M. J. S.)

Zimmerli, E. (*Tubercle*, 15 481, 1933 34) does not accept the claims that have been made concerning the pathogenesis of spirochetosis. He claims that the *Spirochaeta bronchialis* has never been established as a species of its own. He maintains that spirochetes may be found in any sputum provided it is not washed after expectoration. In thirty out of thirty-one cases of pulmonary tuberculosis he demonstrated post mortem that the spirochetes which were present came from the mouth and were not found below the bifurcation of the bronchi. He concludes that bronchial spirochetosis is not established as a disease entity.

Boles, R. S. and Gershon Cohen, J. (*J* 1

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tion for the appearance of the reinfection type and early treatment of that type is the only effective course now open to us in tuberculosis control

(This dictum is in no way accepted by tuberculosis workers and authorities in this country J B H-M J S)

Joress M H (*Am Rev Tuberc* 33 55, 1936) takes up the diagnosis of primary tuberculous infections. He states that the diagnosis of primary tuberculosis is based upon the development and persistence of pneumonic shadows. These pneumonic infiltrations show no physical signs or symptoms. He feels that primary tuberculosis may readily be overlooked in contact children because of their lack of symptoms and physical signs. Its recognition is made possible only through the use of serial roentgenography.

(He does not mention a positive tuberculin test as a prerequisite for such a diagnosis J B H-M J S)

#### DIAGNOSIS

Pettingill, O S (*New Eng J Med* 211 240, 1934) emphasizes that the presence of pulmonary tuberculosis and its progress are usually shown earlier by x-ray than by symptoms and physical signs. The same he finds true in regard to the evaluation of activity of the disease.

(This is not generally accepted, however J B H-M J S)

Merrill, A. S (*New Eng J Med* 211 916 1934) reminds us again that roentgenographic interpretation of pulmonary tuberculosis is not always the simple matter it is sometimes thought. Thus for the diagnosis of childhood tuberculosis, simple hilar enlargement and increased linear markings alone are insufficient. In the adult definite parenchymatous changes must be present to warrant a diagnosis of clinical tuberculosis and the effect of such conditions as asthma, bronchitis, dust inhalation and emphysema, or variations from the normal markings must be considered.

Nissler, C W, Sokoloff M J, and Cohen L (*Am Rev Tuberc* 32 702, 1935) point out that there are many nontuberculous pulmonary conditions in children which frequently simulate tuberculosis. Such conditions may be apical and unilateral. Again the child may have a positive tuberculin test and x-ray findings suggesting tuberculosis and yet have a nontuberculous lesion in the lungs. They emphasize the importance of a careful history, clinical observations, x-ray and laboratory studies. Careful study of the sputum and of the gastric contents, the use of sputum in making cultures, guinea pig inoculations and smears are of great help in the differential diagnosis. They add that bronchoscopic studies are of great value in doubtful

cases in which the sputum is repeatedly negative for in this way secretions may be obtained directly from the foci free of contamination while in addition this method also provides direct visualization of the bronchi.

(All of this is theoretically sound advice, but extraordinarily difficult to carry out in actual practice. The advice to use every method possible in diagnosing tuberculosis in childhood and not to rest the decision on x-ray alone, for instance, is sound and sane J B H-M J S)

#### TREATMENT

Weisman J I (*Am Rev Tuberc* 33 522 1936) propounds an interesting hypothesis as to the formation of effusions in artificial pneumothorax treatment. He found pleural adhesions present in 100 per cent of the cases that developed effusions. This high percentage of adhesions he believes is more than a mere coincidence and he makes a plea for earlier compression therapy in pulmonary tuberculosis.

#### COLLAPSE THERAPY

Overholt R H (*New Eng J Med* 211 682 1934) discusses the indications for surgical collapse. He advocates temporary phrenic nerve paralysis in the following cases:

- (1) Minimal lesions predominantly unilateral
- (2) Acute or progressive unilateral lesions (predominantly) when pneumothorax fails
- (3) Cases with basal involvement,
- (4) To check pulmonary hemorrhage pneumothorax failing,
- (5) As an adjunct to inadequate pneumothorax when closed pneumolysis seems impracticable
- (6) To prepare a patient for thoracoplasty when he is not yet a good risk but when the upper lobe only is to be collapsed and diaphragmatic function is to be preserved,
- (7) In some hopeless cases for symptomatic relief

He mentions the following indications for thoracoplasty:

- (1) Cases with unilateral cavitation fibrotic and preferably stationary,
- (2) Complicated pneumothorax,
  - (a) uncollapsed cavities,
  - (b) persistent adhesions and pneumolysis impracticable
- (3) Cases of bilateral apical involvement in fair general condition

As to extrapleural pneumolysis and plombage he feels that it has a definite but limited usefulness. He advocates it in

- (1) Bilateral disease too extensive for upper thoracoplasty,

erately and far-advanced tuberculosis at the beginning and at the end of bed rest. He found that a marked improvement of the tuberculous process, as indicated by the leucocyte picture, had occurred following bed rest. The degree of improvement varied markedly in individual cases. On graduated exercise, healing of the lung continued in some cases, remained stationary in others while in some the tuberculous process advanced.

#### CHILDHOOD TYPES OF TUBERCULOSIS

Myers, J. A. and Harrington, F. E. (*J A M A* 103 1530, 1934) sound again the warning that first infection type of tuberculosis or the childhood type of tuberculosis carries a double health liability first, because, in the foci of this type of tuberculosis, tubercle bacilli remain alive over long periods of time, and secondly, because hypersensitivity results which is responsible for a great part of the tissue destruction in tuberculosis. They are optimistic and commend the present program of tuberculosis control in this country because of its aims to prevent the first infection type of tuberculosis from developing in the bodies of children and adults. Thus they feel it is a much sounder policy than any method aimed at immunization which at best is questionable.

Smith, C. A. (*New Eng J Med* 211 147, 1934) on the other hand observes that in children, while the mortality curve descends from the age group of six years on, the curve of tuberculous infection at that age ascends. He feels that in all probability some form of artificial protection for infants will prove to be of value. He cites the studies by Wallgren at Gothenburg and by Park in New York City where there was no mortality in the inoculated children as against 3 per cent in the controls. However, he adds that final judgment of methods of inducing relative immunity must be reserved.

Petroff, S. A. (*New Eng J Med* 211 677, 1934) again takes issue with the followers of Calmette. He studied six different cultures of Calmette's attenuated tubercle bacilli over a period of eight years, three of which came from Paris and one directly from Calmette. The first of these proved quite pathogenic while an occasional guinea pig developed tuberculosis from the others. Petroff explains these discrepancies on the basis of "dissociation." He also failed to find any greater immunity with Calmette's method than with heat-killed organisms. Calmette and Neufeld, on the other hand, explained Petroff's results on the basis of contamination. Petroff concludes that the BCG vaccine is not safe for wholesale vaccination.

Kereszturi, C., Park, W. H., Vogel, P. and Levine, M. (*Am J Dis Child* 48 507, 1934) give a statistical analysis of the progress of over

1000 children, some of whom had received BCG, others serving as controls. Many factors were considered in the study, including type of tuberculous exposure, age of children at time the vaccine was administered, as well as clinical and in some cases x-ray observations. They found that BCG was not only harmless but apparently decreased the mortality due to tuberculosis. A detailed analysis of observations on 95 children, all of whom were known from birth and all exposed to open tuberculosis within the first year of life, indicated that the mortality due to tuberculosis was 1.9 per cent in the children receiving BCG and 9.7 per cent in the controls.

Wallgren, A. (*J A M A* 103 1341, 1934) reports the results of BCG inoculation in 230 children. These children were examined roentgenologically at least once a year. Only one of the 230 inoculated children exhibited, by x-ray, decided tuberculous infiltration of the hilum. Subsequent x-ray examinations disclosed a rapid disappearance of the density of the hilum so that a year after its manifestation the roentgenograms showed an almost normal condition. Only two out of the 230 children inoculated died, neither of them from tuberculosis. (Without controls such a study is valueless. J. B. H.-M. J. S.)

Hawes, J. B., 2nd, Wood, N. K. and King, D. S. (*New Eng J Med* 210 1321, 1934) report the results of their survey made for the purpose of evaluating the work of the Prendergast Preventorium in Boston with reference to its usefulness in protecting children from tuberculosis and whether its work justified its further continuation. Seven hundred and five children who had been in definite contact with open cases of tuberculosis and each with a positive von Pirquet formed the basis of their study. Of this group only one had died of tuberculosis while only two developed clinical pulmonary tuberculosis. In addition to this, the standards of living and health and happiness of both the family and the children were markedly improved as a result of the teaching and care received at the Preventorium. They conclude that the preventorium is worthwhile and should be continued.

(A further study of 705 control children has since been made, demonstrating in a striking way the value of the preventorium. J. B. H.-M. J. S.)

Myers, J. A., Harrington, F. E., Stewart, C. A., and Wulft, M. (*Am Rev Tuberc* 32 631, 1935) take up the treatment and the prognosis of the so called first infection type of tuberculosis. After discussion as to treatment, they state rather emphatically that hospitals, preventoria, special schools, and so forth, can not influence the course of the first infection type of tuberculosis. They state that observa-

thoracoplasty Another is far advanced unilateral lesions with cavitation and most of the lung tissue destroyed He advises, however, that, with lesions in the middle of the lung or at the base, pneumothorax should be tried first

(His figures as to failures and deaths in pneumothorax must be confirmed before they can be accepted J B H-M, J S)

Hedblom, C A, and Van Hazel, W (*J Thoracic Surg* 4 55, 1934) report on the combined results of 3762 thoracoplasties found in the literature since 1926 along with 200 of the authors' own cases Of the total number operated upon, 35.4 per cent were clinically cured and 22.2 per cent improved or a total of 57.9 per cent with favorable results They conclude that surgical treatment offers to a definite group of patients the best if not the only prospect of arrest of tuberculous disease

Jessen, H (*J Thoracic Surg* 4 1 1934) gives his results of thoracoplasty in bilateral tuberculosis with cavitation In 25 patients with bilateral cavitation 60 per cent are shown to be saved and only 40 per cent lost in contrast to an expected 100 per cent mortality He adds that the complete resection of the first two ribs is a great step forward

Fisher, L (*J Thoracic Surg* 4 41, 1934) finds that nearly 36 per cent of apical cavities were closed by scalenotomy and phrenicectomy In a group in which scalenotomy as an independent procedure was employed from 6 months to 3 years subject to phrenicectomy, 31 per cent of cavities were closed and 43 per cent showed negative sputum

Peters, L S and Cimish, P G (*Am Rev Tuberc* 33 44 1936) writing on results in intrapleural pneumolysis state that 78 per cent of cases with partial compression can be converted into complete collapse and thus made well They deplore that such a large number of pneumothorax workers are still reluctant to avail themselves of this added advantage in compression therapy

Dufault, P and Laroche, A (*Am Rev Tuberc* 33 219 1936) consider the results of intrapleural pneumolysis They found that this procedure is indicated in 40-60 per cent of artificial pneumothorax cases In a smaller percentage it permits the carrying on of a pneumothorax which would otherwise have to be discontinued They found that most of the complications from this operation occurred in the advanced active and unfavorable cases and that no fair estimate of results could be arrived at without a just appraisal of the original material Thus in patients with advanced bilateral and active disease although their chance of improvement with this operation is bound to be slim, still it is a chance worth taking and one that the patient should be given They add that a

judicious choice based on careful observation on the part of the clinician and a conservative, selective and a very precise technic on the part of the surgeon are the necessary requirements for any reasonable degree of success

Carman H F (*Am Rev Tuberc* 33 491 1936) pleads for more extended use of bilateral pneumothorax He finds that bilateral pneumothorax offers hope to otherwise hopelessly sick patients He emphasizes that the treatment be instituted by someone who is familiar with pneumothorax in general and who has a knowledge of the physiology of the cardiorespiratory system He further urges that treatment be started early before formation of thick-walled cavities, fibrosis and pleuritic adhesions take place

Corsello, J N and Bruckheimer, R M (*Am Rev Tuberc* 33 502 1936) reporting 36 cases of bilateral simultaneous artificial pneumothorax therapy agree with the writers referred to above as to its usefulness They state that bilateral simultaneous artificial pneumothorax is a valuable, effective and comparatively safe form of treatment for certain cases of advanced pulmonary tuberculosis that otherwise would offer very poor prospects for recovery

Matz, P B (*Am Rev Tuberc* 33 533, 1936) writes on the end-results of the surgical treatment of pulmonary tuberculosis He arrives at the conclusion that by a careful selection of cases in earlier stages, and using an improved operative technic, the results will be more satisfactory and the mortality rate will be still further reduced He adds that there should be no hesitancy in using the various surgical collapse measures in the treatment of advanced pulmonary tuberculosis

#### PNEUMOCONIOSIS

Pope, A S and Zacks, D (*Am Rev Tuberc* 32 229, 1935) investigated representative groups of granite and foundry workers in Massachusetts as to the frequency of silicosis and of silicosis along with tuberculosis They found it definitely correlated with the duration of exposure to dusts containing free silica and to the concentration of such dusts Among the granite workers examined silicosis alone was found in 15.2 per cent and silicosis complicated with tuberculosis in 7.6 per cent They found tuberculosis to be the cause of death in over one third of all granite workers, three times that found in foundry workers and four times that in all males of twenty years and over The silicosis in foundry men was not only less frequent but also less advanced than that in granite workers They add that though there is an excess of tuberculosis deaths among foundry workers, pneumonia, which is the cause of about one fourth of all deaths in foundrymen appears to be the greatest occupational hazard in that industry

- (2) As a preliminary to thoracoplasty in doubtful cases,
- (3) As an adjunct to other procedures in bilateral disease

Hedblom, C. A. (*Am Rev Tuberc* 32 1, 1935) made a very extensive study of the results of surgical treatment of pulmonary tuberculosis. After summing up the results of the leading thoracic clinics as well as reviewing his own work he concluded that surgical treatment of pulmonary tuberculosis offers to properly selected patients not suitable for pneumothorax therapy the best if not the only prospect of a complete arrest of the disease, and when that cannot be achieved, of relief of symptoms and prolongation of life. He stressed the fact that proper selection of the patients and of methods and of the most opportune time for operation demands the closest cooperation between the phthisiologist and the surgeon. Adequate application of the method or combination of methods, indicated early in the disease before extensive destructive changes in the lung and before secondary visceral damage have occurred, will result in minimal mortality, a maximal conservation of respiratory function and in the greatest possible measure of rehabilitation.

Dolley, Frank S. (*Am Rev Tuberc* 32 32, 1935) states that the outstanding advances that have been generally made during the past few years in thoracoplasty are these:

- (1) The gradation of rib resection both in length and number to fit the patient's condition, age and the character and extent of his pulmonary involvement
- (2) The minimal sacrifice of uninvolved, healed lung even though by so doing a series of operative stages may be necessary,
- (3) That the primary and all important subject of surgical collapse of the chest is not to obtain relaxation or even up proximation of the cavity walls but rather cavity obliteration, for, unless the walls are actually in contact, it is very doubtful if actual scar tissue healing will occur.

Beatty, O. A. (*Am Rev Tuberc* 32 41, 1935) made a study of end results in tuberculous patients who have been treated by means of phrenicectomy in the Waverly Hills Sanatorium. Results in 351 phrenicectomies 2 1/4 to 7 years following operation were not highly favorable but in a selective group were distinctly so. He found that best results were obtained in those cases having moderately advanced disease with thin walled cavities less than one inch in diameter with contractile lung tissue surrounding them. On the whole he feels

that end results justify phrenicectomy in only a selected group of patients.

Slavin, P. (*Am Rev Tuberc* 32 535, 1935) describes some of the unfavorable results of phrenic paralysis in pulmonary tuberculosis with cavity. He mentions various types that were unfavorably affected by therapeutic phrenic paralysis. Two of them with excavated exudative and large fibrocaseous lesions developed postoperative stagnation of sputum in the cavities and accelerated detachment of caseous tissue, resulting in a rapid spread of the cavitation and massive extension of the disease. In large subpleural cavities, representing a third group, phrenic nerve paralysis causes impairment of drainage leading to progressive destruction within cavity walls. In cases with advanced fibroid tuberculosis with cavities there may be a dangerous postoperative reduction of lung tissue. He found that, in all these groups, high elevation of a paralyzed diaphragm does not seem to diminish the untoward effect of the operation.

Hare, H. F. and Davenport, L. F. (*New Eng J Med* 211 762, 1934) studied 83 cases of phrenic neurectomy at the Middlesex County Sanatorium in Massachusetts. Fifty four of these were permanent and 29 temporary. They found paralysis of the diaphragm to be effective in:

- (1) Cavitation in the lower lobe about the hilum and occasionally in recent thin walled upper cavities,
- (2) In recent disease about the hilum and at the base,
- (3) As a supplementary measure in partial but unsuccessful pneumothorax and in reexpanding pneumothorax,
- (4) As a second choice operation in recurrent hemoptysis, pneumothorax having been unsuccessful and to control symptoms in active disease.

Slavin, P. (*Am Rev Tuberc* 3 215, 1936) pleads for phrenic paralysis in the treatment of centrally located, isolated pulmonary tuberculous cavities. He argues that closure of such cavities by artificial pneumothorax cannot be accomplished in a selective manner. He feels that by means of paralysis of the diaphragm such isolated cavities may be closed with a minimal loss of function of the remainder of the lung.

Coryllos, P. N. (*J Thoracic Surg* 4 30, 1934) discusses thoracoplasty versus artificial pneumothorax. He makes the remarkable statement that pneumothorax shows 70 to 80 per cent of failures or deaths. Thoracoplasty on the other hand yields 40 to 60 per cent of clinical cures in the patients upon whom pneumothorax has failed. He points out that unilateral, apical cavities offer the most typical indication for



thoracoplasty. Another is fair advanced unilateral lesions with cavitation and most of the lung tissue destroyed. He advises, however, that, with lesions in the middle of the lung or at the base, pneumothorax should be tried first.

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Gardner, L. U. (*J. A. M. A.* 103 743, 1934) gives a brief summary of the effect of inhaled silica on normal and on tuberculous lungs. Most patients with silicosis die of complicating tuberculosis, the source of which may be endogenous or exogenous. Dusts containing silica are pre-eminently dangerous and likewise at least one of the silicates—*asbestos*—is very dangerous. Silica is a tissue poison which in low dilutions causes nodular fibrosis while in higher concentrations it produces a rapid necrosis of cellular tissue. Of great importance, he adds, is the fact that silicosis specifically predisposes the lungs to infection with the tubercle bacillus.

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(We quite fail to see why an occupational history is "often impossible" in a general hos-

pital any more than in one's private office, dyspnea and limited chest expansion, while not conclusive, surely are of great importance. J. B. H.-M. J. S.)

#### MISCELLANEOUS

Watkins, J. H. (*Am. Rev. Tuberc.* 32 127, 1935) made a statistical study of postwar changes in the trend of tuberculosis mortality. He found that the downward tendency of tuberculosis mortality has been faster since the war than before the war for all states in the Registration Area of 1911 except Vermont. In that state the decrease may be attributed to the increasing mortality from tuberculosis among the granite workers. In general the alteration in the statistics has been greatest in New England and the Atlantic states. The postwar trend has been greater than that of the prewar for both sexes and at all ages except over 65 years in the registration states of 1900. The greatest differences were found at the younger age groups. At ages over 15 the differences were greater among males than among females. In 1921 when the characteristic statistic tendency for the next decade was initiated, the male trend-line began at a definitely lower level than did the female. He also adds that before the war the female tuberculosis mortality rate was greater than the male throughout the life span. This was also true of the postwar period except for the age group, 15-24, when the male ratio exceeded the female.

Bates, R. R. (*Am. Rev. Tuberc.* 32 161, 1935) made a follow-up study of medical students and physician patients discharged from Trudeau Sanatorium between the years of 1916 and 1931. He examined them primarily with a view to correlating the character and amount of work done during the first and second postdischarge years with the number of relapses that occurred. In the first place he noted that only a slightly greater proportion of medically educated patients came early for treatment, but they left on the whole in better condition than did the general run of patients. His conclusions are that what one does on leaving the sanatorium is not the only important factor concerned in maintaining health. Most of the cases that relapsed came from the "resting" and limited-work groups and not from the "hard working groups" of which only 19 per cent failed to remain well. Stiehm, R. H. (*Am. Rev. Tuberc.* 32 171, 1935) made a survey of tuberculosis among University of Wisconsin students. With the institution of a definite case-finding program, the increase in the number of cases of pulmonary tuberculosis found was 430 per cent above that of a previous fourteen year average. Roentgenologic examination indicated that approximately 5 per cent of the positive reactors had adult type

tuberculous infiltration Approximately 1 per cent of the positive reactors, and 0.2 per cent of those tuberculin-tested, had lesions requiring sanatorium treatment

Friedman E and Hawes, J B 2nd (*New Eng J Med* 211 446 1934) advocate either single or multiple puncture method for tuberculin skin tests They found that single puncture (Stewart method) and multiple puncture (Craig method) are less painful than scarification The technic is also quite simple as no special instruments are necessary, an ordinary sewing needle being employed They also found that the incidence of too superficial scarification is eliminated and thus there is less traumatic reaction They found the method to be reliable and urge its adoption

Newcomb, A L (*Am Rev Tuberc* 32 507 1935) makes very light of the incidence of tuberculosis among juvenile diabetics His report is based on the observation of only forty diabetic children In only six children, or 15 per cent, the tuberculin test was found to be positive No case of adult type tuberculosis or phthisis was found

(E P Joslin has conclusively demonstrated

that juvenile diabetic boys are thirteen times as liable to tuberculosis as are normal boys J B H-M J S)

Flood, C (*New Eng J Med* 212 379, 1935) gives a résumé on the present status of treatment of the pregnant tuberculous woman He emphasizes that ordinary statistics in this matter are not conclusive as they are not complete He recommends the following in the treatment of tuberculosis in pregnancy In patients with latent tuberculous disease, especially those with a suspicious history or x-ray changes, sanatorium care should be advised, but not abortion Likewise, in early active cases it is better to provide sanatorium care with or without pneumothorax and let the pregnancy alone In an active unilateral case with definite physical signs pneumothorax should be instituted at once as in the latter months of pregnancy the disease is accelerated If pneumothorax is impossible, then abortion should be resorted to early for the same reason He points out also that after the first sixteen weeks of pregnancy abortion is a major procedure, at least in the tuberculous, and should be undertaken only with great caution

#### DANGERS TO EYESIGHT

Indiscriminate use of weight reducers, hair dyes and depilatories is causing serious injury to eyesight in the United States according to a warning by Dr Walter I Lillie in a recent issue of *The Sight Saving Review*, quarterly journal of the National Society for the Prevention of Blindness

Case stories of eye tragedies among his patients are cited by Dr Lillie who is a practicing ophthalmologist in Philadelphia and a member of the Department of Ophthalmology of the Temple University School of Medicine there Writing on 'Cosmetics Detrimental to Vision' he says

Individuals who use cosmetics are unwittingly subjecting themselves to visual dangers We are all potential victims because the present antiquated Food and Drugs Act passed in 1906 only requires the manufacturers of food and drugs to label their products properly and does not penalize the acts of adulteration and misbranding False and fraudulent therapeutic claims must be proved before the product can be removed from the market

These two little words 'and fraudulent' compel the Government to prove that the manufacturer knows the customer is being swindled This has prevented any adequate control over quack or dangerous remedies Extraneous advertising of these products through the newspapers, magazines and radio is without Federal control

Today the billion dollar a year cosmetic industry is not subject to any Federal regulations unless the labels bear medicinal claims which never occurs There is no legal way to protect the public against dangerous cosmetics Toilet preparations which are known to be harmful by the medical profession can

not be taken off the market regardless of any disfigurement or injury they may inflict Although poisonous cosmetics that ravage their users by paralyzing blinding or disfiguring them are the exception rather than the rule the medical profession should be alert to the possibilities and probabilities of visual and bodily damage which may result from their use

The untoward visual effects may be temporary or permanent depending upon the nature of the ingredient or the amount used and the tolerance of the individual The eyes are usually affected in one of two ways either through direct contact with the preparation or indirectly through the absorption of the poisonous ingredient in the body Three groups of cosmetics have the potentiality of producing severe ocular damage namely (1) weight reducing preparations (2) hair dyes and (3) depilatory ointments

The present administration has asked for a new food and drugs act which will give consumers better protection than the present antiquated pure food law affords The officials of the Department of Agriculture have drafted the Copeland Bill (erroneously called the Tugwell Bill) which is proposed in the interest of the public and the honest manufacturer This act is to afford Federal control of the manufacturing labeling selling advertising and shipping of prepared foods, drugs and cosmetics

This bill is actively supported by the American Medical Association, American Federation of Labor, The National Congress of Parents and Teachers and eleven other national women's organizations A powerful opposition lobby has been organized and is sponsored by the Proprietary Association of America and numerous allied groups

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The first chief complaint at once suggests that this may be a cardiac case. She complained of pain in the chest. It does not say where the pain was. It was either cardiac or pleural pain. As we go on the history begins to shape itself into some sort of pulmonary or bronchial affair, and not cardiac. The type of pain is not described, whether associated with cough or breathing, but I am prejudiced having read this through and knowing that a thoracotomy was done. I am assuming that it had something to do with the pleural cavity, lungs or bronchi. The duration is 3 years, which is certainly not an acute story. One, then, is led to the tentative diagnosis of something in the mediastinum, because just before she came in there was a lobulated mass seen by x-ray lying up against the sternum to the right of the heart. I think that a review of the plates over these many months prior to admission would be of considerable interest. It is possible that we may pick out something there that was not reported at that time. I only hope that that is true. I believe the tonsillectomy had nothing whatever to do with the present illness. She had essentially the same set of symptoms after the operation as before, namely, cough, fever and chest pain, which may have been accentuated, but there is nothing here to indicate that she had a postoperative pulmonary abscess.

To go on to the physical examination she had a hacking periodic cough in the presence of dyspnea, and the trachea was in the midline. I should like to know if she had any clubbing of the fingers.

DR SANDERSON: No, she did not.

DR BREED: It says here that the right lung appeared to be larger than the left. It would seem to me that, if she had anything producing bronchial obstruction, one would find signs of a lobar collapse and the right lung would appear to be smaller, so I think we can pretty well rule out right bronchial obstruction. There is one very interesting point in physical examination. It says that from a point slightly to the right of the sternum anteriorly to the left axillary line there were dulness, diminished fremitus and distant breath sounds. That area covers essentially the area of the heart and I do not see how we can pay any attention at all to such an observation, because one would expect to find these signs over the heart. One would expect some diminished fremitus and also some diminished breath sounds in the same area normally. Then it says that the diaphragmatic motility was equal bilaterally, but that the left radial pulse was weaker than the right. Were there any blood pressure observations taken?

DR SANDERSON: The blood pressure was a little low, around 110 to 115 systolic and about 65 to 80 diastolic.

DR BREED: Was it equal in the right and left arms?

DR SANDERSON: I do not know whether that was measured. I do not know who made the observation of this difference.

DR BREED: It is possible that this observation does not mean anything. It should have been checked up by blood pressure readings in both arms. If the radial pulse on the left was weaker she ought to have a lower systolic blood pressure on the left. Then it says, "Elevation of the arms lessened this discrepancy." I will have to throw this observation out entirely because I do not know whether there was a lower systolic pressure in the left radial artery. Do you?

DR SANDERSON: No.

DR BREED: That then, is out. I am glad of that because I would not know what "elevation of the arms lessened this discrepancy" would mean. Now as to the heart, except for there being some dulness over the heart shadow, poor heart sounds, which do not mean anything in a woman of 33 years, there is this question of a mass in the mediastinum. It also says that the heart was displaced somewhat to the left but the left lung was clear. The fact that by x-ray a left lung is clear does not tie up very well with this point in the physical examination, breath sounds and fremitus diminished over the left chest posteriorly. The only explanation I can see in the presence of the negative x-ray of the left lung is that the heart was big and pushed over and perhaps gave some pressure through into the back.

What did she have in her mediastinum? It is remotely possible that she might have an encapsulated empyema from some unrecognized pneumonia, although it seems a long time for this to have been present. Also she should have had a higher temperature and be sicker than she was. I think it is a fair question to ask how sick this woman really was. Was she in extremis? Was she operated on because you had to try to save her life?

DR SANDERSON: She was operated on because she was going continually downhill. We could not help her medically. She had attacks of dyspnea and palpitation, and her color was bad. She really looked very sick.

DR BREED: One has to consider encapsulated empyema or abscess with a bronchial fistula. One has to consider lymphoma and carcinoma. There is no real evidence that there is any connection between this and the bronchus. Certainly there is no great pressure on the bronchus. I do not suppose she had been bronchoscoped elsewhere?

DR SANDERSON: That was deemed not advisable.

DR BREED: I meant elsewhere. She is not too young to have carcinoma and she, of course,

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 22491

### PRESENTATION OF CASE

A 33 year old Canadian housewife was admitted complaining of pain in the chest.

During the 2 years preceding her entry the patient occasionally had mild attacks of substernal oppression and breathlessness. She remained fairly well, however, until 7 months before coming to the hospital, at which time she developed a cough associated with fever and pain in the chest, first on the right side and then bilaterally. These symptoms continued and she remained in bed for 2 weeks. An x-ray examination of the chest at this time was said to have been negative except for evidence of infectious arthritis. Accordingly, 2 weeks later a tonsillectomy was performed. Subsequently the patient had periodic dyspnea, frequent palpitation, fever up to 102.5° and progressively increasing cough productive of nonodorous sputum. There was no hemoptysis and no further note of chest pain. The dyspnea became worse during the last 3 months and the patient was confined to bed most of the time. A chest x-ray taken 4 months before entry was again essentially negative, but another taken one week before admission showed a lobulated mass along the right cardiac border. In the lateral view it was situated anteriorly just beneath the chest wall. There was no pulsation, and the diaphragmatic excursion was unimpeded.

Physical examination showed a well-developed, poorly nourished, dyspneic young woman frequently troubled by paroxysms of hacking cough. The trachea was in the midline and the right side of the chest seemed larger than the left. There were dullness, diminished fremitus, and distant breath sounds over an area extending from a point slightly on the right of the sternum anteriorly to the left anterior axillary line. Breath sounds and fremitus were diminished over the left chest posteriorly. Diaphragmatic motility was equal bilaterally but the left radial pulse was much weaker than the right. Elevation of the arms lessened this discrepancy. No details of the examination of

the heart were noted except for the fact that the quality of the sounds was poor. The liver was not enlarged but its edge was tender.

The temperature was 100°, the pulse 110. The respirations were 20.

Examination of the urine showed a specific gravity of 1.010 with a trace of albumin. The sediment contained an occasional red and white blood cell in an uncatheterized specimen. The blood showed a red cell count of 4,000,000, with a hemoglobin of 70 per cent. The white cell count was 16,400, 70 per cent polymorphonuclears.

An x-ray film of the chest showed a hazy dullness obscuring the lower half of the right lung field, apparently due to fluid in the pleural cavity. Faintly seen through the dullness and extending parallel to the spine was an oval area of increased density which was thought to represent a mass close to the mediastinum. The heart shadow was displaced somewhat to the left and the left lung was clear.

On the day following entry an exploratory thoracotomy was performed.

### DIFFERENTIAL DIAGNOSIS

DR WILLIAM B. BREED: There are two things I would like to know about. One is whether this patient was followed in this hospital at any time prior to her admission, and the other whether all of these x-ray plates are our own and interpreted by Dr. Holmes' department. I think it makes a great deal of difference in interpreting the significance of the negative x-ray findings such a short time before she came in for operation.

DR TRACY B. MALLORY: The first set of x-ray plates was not made here. Only anteroposterior views were taken and there was no lateral view at the time of the first x-ray examination.

DR BREED: Have we the films?

DR MALLORY: Yes.

DR BREED: One unusual aspect of this case is—and I do not wish to cast aspersions on the surgical service—that a patient with this long history and very scanty work-up of material should come in on one day and have a thoracotomy on the next day. Either she was in extremis, or the diagnosis was perfectly clear!

DR ROBERT SANDERSON: She had been in another hospital for some time where a thorough work-up had been done with, however, essentially negative results except for the x-ray findings. She was seen there in consultation by Dr. Churchill who transferred her to the Massachusetts General.

DR BREED: I take it then that the diagnosis was clear when she came into the hospital. I think the diagnostic acumen was pretty good. If you knew the diagnosis and operated for a specific disease in that short time, I congratulate you!

The first chief complaint at once suggests that this may be a cardiac case. She complained of pain in the chest. It does not say where the pain was. It was either cardiac or pleural pain. As we go on the history begins to shape itself into some sort of pulmonary or bronchial affair, and not cardiac. The type of pain is not described, whether associated with cough or breathing, but I am prejudiced having read this through and knowing that a thoracotomy was done. I am assuming that it had something to do with the pleural cavity, lungs or bronchi. The duration is 3 years, which is certainly not an acute story. One, then, is led to the tentative diagnosis of something in the mediastinum, because just before she came in there was a lobulated mass seen by x-ray lying up against the sternum, to the right of the heart. I think that a review of the plates over these many months prior to admission would be of considerable interest. It is possible that we may pick out something there that was not reported at that time. I only hope that that is true. I believe the tonsillectomy had nothing whatever to do with the present illness. She had essentially the same set of symptoms after the operation as before, namely, cough, fever and chest pain, which may have been accentuated, but there is nothing here to indicate that she had a postoperative pulmonary abscess.

To go on to the physical examination. She had a hacking periodic cough in the presence of dyspnea, and the trachea was in the midline. I should like to know if she had any clubbing of the fingers.

DR SANDERSON: No, she did not.

DR BREED: It says here that the right lung appeared to be larger than the left. It would seem to me that, if she had anything producing bronchial obstruction, one would find signs of a lobar collapse and the right lung would appear to be smaller, so I think we can pretty well rule out right bronchial obstruction. There is one very interesting point in physical examination. It says that from a point slightly to the right of the sternum anteriorly to the left axillary line there were dulness, diminished fremitus and distant breath sounds. That area covers essentially the area of the heart and I do not see how we can pay any attention at all to such an observation, because one would expect to find these signs over the heart. One would expect some diminished fremitus and also some diminished breath sounds in the same area normally. Then it says that the diaphragmatic motility was equal bilaterally, but that the left radial pulse was weaker than the right. Were there any blood pressure observations taken?

DR SANDERSON: The blood pressure was a little low, around 110 to 118 systolic and about 65 to 80 diastolic.

DR BREED: Was it equal in the right and left arms?

DR SANDERSON: I do not know whether that was measured. I do not know who made the observation of this difference.

DR BREED: It is possible that this observation does not mean anything. It should have been checked up by blood pressure readings in both arms. If the radial pulse on the left was weaker she ought to have a lower systolic blood pressure on the left. Then it says, "Elevation of the arms lessened this discrepancy." I will have to throw this observation out entirely because I do not know whether there was a lower systolic pressure in the left radial artery. Do you?

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DR SANDERSON: That was deemed not advisable.

DR BREED: I meant elsewhere. She is not too young to have carcinoma and she, of course,

is not too young to have lymphoma I do not know what they expected to find They apparently made up their minds that she should be operated on I am not able to come down to one diagnosis, and I may perfectly well have not even mentioned the correct one But I am going to mention as possibilities encapsulated pus, lymphoma and carcinoma I do not see how one can tell without looking, and you apparently felt the same way

#### X-RAY INTERPRETATION

DR GEORGE W HOLMES There was only one film taken in this hospital and that was after the operation This series of films was taken before the patient came to the hospital Here is the chest film It is interpreted as being negative The curve of the right auricle is a little prominent and there is some straightening of the left border of the heart But such a condition as that would be within normal limits, but one should keep the appearance in mind, however This film was taken on the first of January These were taken in July That is quite a mass to appear in 6 months There is a sharp bulge outlined here in the region of the right auricle It is very distinct and slightly lobulated The change on the left side is very slight, possibly it is a little more prominent The diaphragm on the right is higher than it was before but certainly a mass of that size arising from the bronchus would cause more evidence of bronchial obstruction than we see here It seems more reasonable to suppose that the mass is part of the heart shadow or mediastinum rather than a tumor arising primarily in the lung We have the fluoroscopic note that the diaphragm moved well on both sides, further evidence of air entering into the chest

DR J H MEANS Dr Holmes, did that pulsate?

DR BREED It says in the note that it did not

DR HOLMES If it had, that would help This is a film taken in an oblique manner and the mass moves to the right with the heart and is probably anterior The esophagus is fairly well filled but the barium is not delayed The stomach is normal Then we have a direct lateral view, which shows that there is nothing wrong with the esophagus, and that the mass is in the anterior part of the chest There is nothing in the character of the shadow itself to help There are no areas of calcification and nothing that looks like teeth that you might get in a dermoid The trachea and esophagus are not displaced The mass is a little too far forward, I think, to arise from glands around the trachea

DR BREED I may say that I did not pay much attention to the question of aneurysm because of the lack of pulsation and because of the

location It is right up against the sternum  
DR HOLMES This mass would be consistent with an aneurysm

DR BREED Aneurysm of the heart?

DR HOLMES It might be an aneurysm of the right auricle Of course it should pulsate If we could be sure of that observation we could rule it out Aneurysm arising from the ascending aorta would not be so far forward Aneurysm of the pulmonary artery might be considered—aneurysm of an artery does not necessarily pulsate

DR BREED So that we cannot really rule out aneurysm here?

DR HOLMES I think you cannot

DR AUBREY O HAMPTON What do you think of the rapidity of the development of this mass, Dr Holmes?

DR HOLMES I think it does not help one way or the other Aneurysm can develop rapidly, tumor can, cyst might if there is hemorrhage into it I think the development is more rapid than most tumors we see but it does not help me at all in making a diagnosis

DR MEANS Is anything said about fluid?

DR HOLMES This film was taken after the operation There is no extension of the mass into the pleural space until after the operation Some of you must have studied these films before the operation Did you, Dr Hampton?

DR HAMPTON I do not know I think so

DR HOLMES I think it would be interesting to see the report you made at that time

DR HAMPTON Do you remember what I said, Dr King?

DR DONALD KING You said there was something in the chest film in the right border of the heart You agreed there was a mediastinal tumor and it ought to be exposed

DR MEANS Dr Churchill had a patient you might recall, with a plunging goiter and the mass on one side became the same size and shape as the heart I do not know how a goiter could hook up with these symptoms It seems to have grown too fast A small cystic affair with hemorrhage would explain it or if it were malignant I think in Dr Churchill's case he thought it was probably dermoid until he cut down on it and found it was thyroid

DR BREED I remember that case The reason I did not consider that was the rapid development of growth

DR MEANS Of course we get rapidly growing tumors of the thyroid

DR MALLORY Dr Sanderson, can you tell us the progression of symptoms after operation and before death?

DR SANDERSON It was chiefly that of collection of fluid The right chest filled up completely and there was a great deal of abdominal fluid Toward the end there seemed to be fluid on the



left side too. She was unable to hold anything on her stomach for the last 3 or 4 weeks, just sips of liquids. An attempt to give liquid by any other route was followed by an increased accumulation of fluid and she finally dehydrated herself. There was a loud rub over the whole anterior right chest at one time. The kidneys did not compensate very well but did not actually shut down until we gave her salyrgan and after that she practically had anuria.

DR BREED: Have you ever seen cancer of the pericardium, Dr Mallory?

DR MALLORY: I have not seen primary cancer of the pericardium. I doubt if there is such a thing. There is supposed to be primary endothelioma of the pericardium but I have not seen that either.

The diagnosis is still wide open. If anyone cares to hazard a suggestion he might hit it.

#### CLINICAL DIAGNOSIS

Mediastinal tumor

DR WILLIAM B. BREED'S DIAGNOSES

Mediastinal tumor

- 1 Lymphoma
- 2 Cancer
- 3 Encapsulated pus

#### ANATOMIC DIAGNOSES

Primary sarcoma (probably fibrosarcoma) of the right auricle

Compression of the superior and inferior venae cavae and esophagus

Mural thrombus, right auricle

Pulmonary atelectasis, bilateral

Hydrothorax, bilateral

Ascites

Chronic passive congestion, liver, spleen and kidneys

#### PATHOLOGIC DISCUSSION

DR MALLORY: This is the specimen that was removed at autopsy. The tumor was not in the mediastinum but in the heart. It evidently arose in the lateral wall of the right auricle, grew into and practically filled the auricular cavity and here the tumor mass, as you see, projects through the tricuspid valve into the right ventricle. At the surgical exploration a very small fragment was removed from the periphery of the tumor which I think was largely nothing but its capsule, since it consisted chiefly of acellular fibrous tissue but a few clusters of rapidly growing spindle cells were seen. Microscopic examination of the tumor itself showed a very rapid growing, highly malignant sarcoma with long rather cylindrical cells which were somewhat suggestive in appearance of muscle cells. In spite of

several hours of search and the use of various special stains, I have not been able to pick up any hint of striations in the tumor cells.

Tumors of the heart of any type are, of course, extremely rare. The most common one is a fibroma or myxofibroma which arises from one of the valve leaflets. The tumor in this case today, however, obviously arose within the musculature of the right auricle. It projected laterally to some extent, producing the shadow which was interpreted as a mediastinal tumor, but most of the growth was inward into the right auricular cavity. A lobular projection from the lower end of the mass projected downward like a short thick finger through the tricuspid valve but was not attached to the leaflets at any point. From the anatomic findings one would have expected the symptomatology from the start to have been that of right-heart failure but only in the terminal stages did this occur.

Dr Churchill's diagnosis at the time of his exploratory thoracotomy was a mediastinal tumor which he believed was producing symptoms from pressure upon air passages and great vessels. Even after he had decided that resection was impossible and had biopsied the tumor I am sure he had no idea that he was dealing with a primary tumor of the heart.

#### CASE 22492

##### PRESENTATION OF CASE

A 79 year old American street cleaner entered complaining of pain in the right upper quadrant.

For about 4 or 5 weeks before entry the patient had been troubled with nonradiating, dull aching pain in the right upper quadrant which gradually increased in severity. Prior to admission this became quite sharp, cramp-like in character, and frequently disturbed his sleep at night. The pain recurred several times daily, particularly after exertion, and caused the patient to be short of breath. The pain lasted for several minutes at a time, had no relation to meals, and occasionally was so severe as to compel him to lie down. About a week before coming to the hospital he first noted that his skin was becoming yellow. The stools were clay colored, his urine was very dark, and the jaundice increased rapidly. Several days before entry he became nauseated and vomited everything ingested. There had been some constipation and considerable weight loss during his present illness but no history of a previous significant ailment was elicited.

Physical examination showed a dehydrated, poorly nourished, elderly man in no apparent discomfort. There was evidence of loss of weight and the skin was loose, wrinkled and showed a

deep icteric tint. The sclerae were yellow and the tongue was heavily coated. The heart was not enlarged but the sounds were distant in character. No murmurs were heard. The blood pressure was 140/85. A few fine rales were audible at the left base posteriorly, in which region voice sounds showed increased intensity. The lungs were otherwise clear. A firm, ill defined, slightly tender mass was palpated in the epigastrium and right upper quadrant, and there was tenderness also at the right costo vertebral angle.

The temperature, pulse, and respirations were normal.

Examination of the urine showed a specific gravity of 1.014 with a large amount of bile. The sediment was negative. The blood showed a red cell count of 4,100,000, with a hemoglobin of 80 per cent. The white cell count was 8,300. The sedimentation rate was 0.3 millimeters per minute. The bleeding time was 1 minute and 45 seconds, the clotting time 5 minutes and 30 seconds. A Hinton test was negative. The non-protein nitrogen was 32, chlorides equivalent to 102 cubic centimeters of N/10 sodium chloride, the  $\text{CO}_2$  combining power 50.5 volumes per cent and the serum protein 6.2 grams. A van den Bergh test showed a direct reaction and there was 26.1 milligrams bilirubin.

A gastrointestinal series showed a normal esophagus, stomach, and duodenum. A flat film of the abdomen demonstrated proliferative changes about the margins of the bodies of the vertebrae and the arteries of the pelvis were moderately calcified. There were no visible stones or other calcified masses but there was some increase in density in the region of the liver. Examination of the remainder of the gastrointestinal tract was negative. The duodenal loop appeared to be normal.

The patient's condition remained essentially unchanged. On the fourth hospital day a laparotomy was performed. The abdomen contained much bile-stained fluid. The liver was definitely enlarged and contained numerous metastatic nodules of carcinoma. No primary focus was found but metastatic nodules were also observed in the culdesac. The gallbladder was not enlarged and there was no palpable dilatation of the common duct. A small nodule in the round ligament was biopsied and the abdomen closed. Postoperatively the patient became disoriented and irrational. Despite the administration of supportive treatment his condition became progressively worse and he died on the twelfth hospital day, seven days postoperatively.

#### DIFFERENTIAL DIAGNOSIS

DR HORACE K. SOWLES "For about 4 or 5 weeks before entry the patient had been troubled with nonradiating dull, aching pain in the right

upper quadrant which gradually increased in severity." There is nothing particularly characteristic about the pain.

"Prior to admission this became quite sharp, clamp-like in character, and frequently disturbed his sleep at night." Now it begins to be somewhat more characteristic of a biliary obstruction.

"The pain recurred several times daily, particularly after exertion, and caused the patient to be short of breath." There we have a slight suggestion that perhaps the pain is of cardiac origin following exertion and yet later on in the physical examination we learn that the patient who is 79 years old has no demonstrable enlargement of the heart, no murmurs and a blood pressure of 140/85, all of which indicates a rather normal heart for a man of 79. As the symptoms develop it seems quite evident that his disease is associated with the liver and biliary tract.

The laboratory examinations are not particularly enlightening. Most all of them are within the range of normal limits except the van den Bergh, which is slightly increased and one might expect that with a patient who is jaundiced.

We have a patient who has had pain in the right upper quadrant which is suggestive of biliary tract obstruction. He has jaundice and his gastrointestinal tract is negative by x-ray. The story is of rather short duration. His pain is not quite that of a typical gallstone colic. It has a more gradual onset. We ordinarily do not associate the jaundice which comes with malignant disease with pain, but I think we should not overlook the fact that a certain proportion of malignant disease associated with jaundice does have pain with it, so because the patient has had pain does not rule out malignant disease as a cause of biliary obstruction.

Probably the large tender mass in the epigastrium was the large liver found at operation. Metastases in the liver substance would have to be very extensive to cause jaundice from liver destruction, and I feel that that is distinctly unlikely. I still think, in spite of there being no enlargement of the gallbladder and no palpable enlargement of the common duct, that he has obstruction of the common duct. The reason he has not developed enlargement and distention of the duct is that his story is of short duration.

The primary focus of malignant disease was not found. Of course the stomach was a logical place to look, but it was negative by gastrointestinal series and operative investigation, so we can rule out the stomach on that evidence. Carcinoma of the head of the pancreas might show only a small primary nodule, even though the metastases were extensive, and nevertheless encroach on the common duct sufficiently to cause

obstruction Carcinoma of the duodenum is very rare, but carcinoma at the papilla is not so uncommon. It seems to me that that is the likely place to look for the primary focus, either carcinoma of the papilla or carcinoma of the head of the pancreas causing obstruction of the common duct. We cannot rule out a distant primary lesion.

DR GEORGE W. HOLMES The x-ray evidence in this case is largely negative and is valuable only in that way. The plain film of the abdomen shows the slight proliferative changes described in the spine and that the arteries of the pelvis are calcified. The bones are those of an old man, nothing abnormal there. I do not see the increased density described but it may be present.

Then we have a fairly good series of films of the gastrointestinal tract and it is interesting to note that the duodenum is perfectly normal, no widening of the loop that you sometimes get in carcinoma of the pancreas. The absence of widening I think is of no value, but its presence may be of some value. Here is another film showing the fundus of the stomach with a normal mucosal pattern and normal rugae also a slight depression in the duodenal loop that you sometimes see with an enlarged gall bladder. It may be due to other causes. The x-ray findings are all negative.

DR. TRACY B. MALLORY Are there any suggestions? It seems as if someone ought to mention Courvoisier's law before we finish.

A PHYSICIAN Was anything found in the prostate clinically?

DR. MALLORY It is recorded that there were no metastases in the culdesac. I think we may assume that the prostate was ruled out at the same time.

#### CLINICAL DIAGNOSIS

Carcinoma of the pancreas with metastases to the liver and peritoneum

#### DR. HORACE K. SOWLES' DIAGNOSES

Carcinoma of the papilla of Vater  
Carcinoma of the pancreas

#### ANATOMIC DIAGNOSES

Primary carcinoma of the bile ducts common  
hepatic and cystic  
Metastases to the liver, lung and kidney  
Icterus  
Bronchopneumonia  
Hydrohemothorax, left  
Arteriosclerosis, aortic and coronary  
Prostatic hypertrophy

#### PATHOLOGIC DISCUSSION

DR. MALLORY The postoperative clinical diagnosis was carcinoma of the head of the pancreas. The lack of distention of the gall bladder at operation was, however, a point against that diagnosis and the autopsy findings explain quite well why it was not distended. We found a large massive tumor within the liver itself, centered about the main hepatic duct to the left lobe. There were also smaller metastatic nodules throughout the liver. The liver was intensely bile stained, both left and right lobes. As we traced down the hepatic ducts we found that just at their juncture, involving also the proximal one centimeter of the common duct and the mouth of the cystic duct, there was a small hard disc-like nodule which microscopically proved to be cancer. There was nothing else found that could be the primary site, so that the carcinoma must have been primary either within the liver and metastasized downward along the lymphatics to the junction of the hepatic and cystic ducts, or it was primary there, and spread upward into the liver. From the anatomic findings one cannot definitely say which was the primary source but on the law of chances it seems more reasonable that the small lesion just at the juncture of the hepatic ducts was the primary focus and that the larger lesion in the liver was metastatic. The gall bladder was collapsed because the cystic duct was occluded.

Terminally he had a bronchopneumonia and we also found a few more widespread metastases. There were pulmonary metastases and a metastasis in the left kidney.

A PHYSICIAN What was in the gall bladder?

DR. MALLORY Colorless slightly mucoid material, no bile.

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## THE SURGICAL TREATMENT OF CERTAIN PSYCHOSES

It has long been known that intracranial tumors, which could be successfully removed surgically, have been found in postmortem examinations of patients with long standing psychoses. Could the diagnosis have been made early there is a possibility that removal of these tumors would have cured the patient of his mental symptoms. There are, moreover, patients with mental symptoms, the result of prolonged pain and the use of drugs in connection with diseases such as trigeminal neuralgia. Here the surgeon, operating on the cause of the symptoms, may rightfully be said to have cured the patient of his psychosis. These and a few other examples suffice to call attention to neurosurgery as one of the adjuncts of psychiatric practice. There is, however, another aspect of

this problem, which has recently been brought to the attention of the medical profession by the work of Egas Moniz, Professor of Neurology in Lisbon. Moniz is well known for his work on arterial encephalography first published in 1931, and for his more complete treatise on this subject, "L'Angiographie Cerebrale" 1934. More recently Professor Moniz has called attention to the operative treatment of certain psychoses.\*

Basing his work upon the physiology of the frontal lobes, Professor Moniz devised an operation to aid patients suffering from the psychosis known as "agitated depression." Patients with this disease often have symptoms of long standing, and it was the more chronic cases of agitated depression that Professor Moniz first operated upon. His plan was to cut and cause disintegration of part of the frontal association fibers without injury to the motor cortex or the speech centers. Thus he succeeded in doing by a special instrument which enters the frontal lobe through a trephine opening. The operation, a relatively simple one in neurosurgery, can be done under local anesthesia. Professor Moniz reports observations on nineteen cases from a varied group of psychoses. Those that did best, however, were of the agitated depression type. In patients with this disease the agitation disappeared immediately and the patient became calm and tractable. Patients who formerly were able only to be cared for in a hospital for mental disease could return to their homes under nursing care. To be sure they had lost something of their initiative and possibly their powers of discrimination. They were, however, nearer a normal state of health than they had been before operation. Six patients have now been so operated upon in this country with equally good immediate results.

Such a radical procedure is not to be widely recommended at the present time. The operation, however, is one that might rightfully be considered in a patient with long standing agitated depression, if done by a skillful neurosurgeon, in a properly equipped hospital. It may mean a better future for certain patients with chronic mental disease. Much more time is needed and many more cases should be reported before valuable conclusions can be drawn from this work. The operation is based, however, on sound physiological observation and is a much more rational procedure than many that have been suggested in the past for the surgical relief of mental disease.

\* Tentatives Operatoires dans le Traitement de Certaines Psychoses by Egas Moniz. Paris: Masson & Co. 1936. 14 pages.

**"GLYOXYLIDE"—A CURE FOR CANCER**

IN view of the recent reinvasion of Massachusetts by literature advertising the remarkable results obtained in the treatment of cancer, tuberculosis and so forth through the use of a remedy concocted by Dr. W. F. Koch, of Detroit, the *Journal* takes this opportunity to advise the members of the Massachusetts Medical Society to obtain the opinions of others before recommending its use. An excellent short summary is contained in a report by the Bureau of Investigation, American Medical Association (*J. A. M. A.* 107:519 [Aug. 15] 1936). Three unfavorable reports have been recorded by committees appointed by the Wayne County (Detroit) Medical Society to investigate Dr. Koch's "cure." The matter has been discussed at different times in the *Journal of the American Medical Association* and is available in reprint form upon application to the Association by anyone that encloses a self-addressed, stamped envelope.

The new remedy is named "Glyoxylide" and apparently supplants the former "antitoxin." While it is true, to the best of our knowledge that no investigation of this new compound has been made, there is no reason for believing that "Glyoxylide" is any more efficacious than the former, discredited nostrum.

**A GREAT RESPONSIBILITY**

THERE is now before the people of the Commonwealth of Massachusetts one of the most important responsibilities that must be discharged by his Excellency the Governor and the Council. This is the appointment of a Commissioner of Mental Diseases.

Even though this matter has been discussed in the daily newspapers, it may be that many do not adequately comprehend the magnitude of this official obligation to maintain excellence of a particular service to the State.

There are at the present time sixteen Massachusetts State Hospitals for the treatment of mental illness, with over 28,000 inmates. In addition there are seventeen private hospitals and two veterans hospitals with 1,986 patients. All private hospitals of this class are under the supervision of the State Department of Mental Diseases in one way or another. The admissions to all of these institutions in 1935 amounted to 7,300 of these afflicted persons. Besides these large numbers, there are thousands of our people on the borderline of unstable mental health many of whom will, sooner or later, require official recognition. Evidence of the interest of physicians and the laity in the problems involved in dealing with these groups is shown by many requests submitted to the President of the Massachusetts Medical Society for information as to

the qualifications of the Commissioner of Mental Diseases who must direct the complicated agencies incident to the administration of state policies.

This *Journal* believes that the consensus of recognized psychiatrists is that a Commissioner of Mental Diseases should have had a broad experience and should possess good judgment as is expressed by the following qualifications:

**THE COMMISSIONER OF MENTAL DISEASES OF THE COMMONWEALTH OF MASSACHUSETTS****I Should be—**

- (1) A physician who is a graduate of a Class A Medical School, eligible to practice in Massachusetts, a member of the American Medical and American Psychiatric Associations.
- (2) A psychiatrist, certified as such by the American Board of Psychiatry and Neurology, or eligible to such certification, able to qualify as an alienist in any court of law.
- (3) A creditable representative of the Commonwealth at state, inter-state and national meetings and in matters pertaining to interstate and Federal relations.

**II Should have—**

- (a) Experience in the management and treatment of the insane preferably in institutions in the Commonwealth, equivalent to that required of Superintendents by the Department of Mental Diseases—five years in a mental hospital as a physician, in the several grades and five additional years as Assistant Superintendent and Assistant to the Commissioner or as Assistant to the Commissioner.
- (b) Information of the condition and needs of the Department of Mental Diseases and the sixteen institutions under its control and of established precedents to enable him—
  - (1) To prepare a budget as required by the statutes.
  - (2) To supervise intelligently the annual expenditure of upwards of eleven million dollars.
  - (3) To represent acceptably the Department of Mental Diseases in its dealings with the Commission of Administration and Finance and its Budget Commissioner, the Committees on Public Institutions and Ways and Means of the General Court and with other State officers, committees and departments.

(c) *Knowledge* (no less than that of the Superintendents of the institutions in the Department) of hospital management, the treatment of mental diseases, mental hygiene and research and of the management, custody and treatment of defective delinquents and criminal insane so that in planning, coordinating and supervising all these activities he may have the complete respect and cooperation of these Superintendents

(d) *Cognizance* of the essentials governing the selection of a site for a new hospital or school, of the planning and construction of new institutions or of buildings and improvements at existing institutions and of the need for new institutions, buildings and improvements

Fortunately there are several psychiatrists in the State who measure up to these requirements

The *Journal* also believes that the problems of mental illness are inherently important factors in our social structure and include in addition to the custodial care of recognized cases of mental illness, the adoption of preventive measures which may insure, so far as possible happy and useful lives for individuals rather than the distress of body and mind resulting from neglect of the etiologic principles underlying the problems of psychology

Even though the economic problems involved in dealing with human psychoses are important, we wish to impress upon the public that the motivating action of the executive in this appointment should be based on the higher ideal of a sympathetic regard for human suffering in dealing with the complicated details of the administration of the Department of Mental Diseases

The medical profession has made great contributions to humanity in its various fields and especially in psychiatry, Massachusetts is recognized as standing high among her sister states

Can this Commonwealth disregard the articulate sentiment of organized medicine in the appointment of a Commissioner of Mental Diseases?

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

CLUTE, HOWARD M B S, M D Dartmouth Medical School 1914 F A C S Professor of Surgery Boston University School of Medicine

Surgeon-in-Chief, Massachusetts Memorial Hospitals Surgeon, New England Baptist and New England Deaconess Hospitals Address 171 Bay State Road, Boston, Mass Associated with him is

ALBRIGHT, HOLLIS L A B M D Harvard University Medical School 1931 Second Assistant Visiting Surgeon, Massachusetts Memorial Hospitals Associate of Surgical Staff, New England Baptist Hospital Instructor in Surgery, Boston University School of Medicine Address 171 Bay State Road, Boston, Mass Their subject is "Thyroid Adenomas and Their Clinical Complications With Especial Reference to the Discrete Adenoma" Page 1049

JOHNSON, CHARLES I B S, M D University of Virginia Department of Medicine 1923 Assistant in Otolaryngology, Harvard University Medical School Member of Staff Children's Hospital, New England Deaconess Hospital Brooks Hospital, Massachusetts General Hospital, Massachusetts Eye and Ear Infirmary, Lynn Hospital and Cambridge Hospital Assistant Laryngologist, Massachusetts Eye and Ear Infirmary Address 270 Commonwealth Avenue, Boston, Mass Associated with him is

FERGUSON, CHARLES F A B, M D Harvard University Medical School 1933 Formerly, House Officer, Pediatric Service, Boston City Hospital and The Children's Hospital Now, Resident in Surgical Service, The Children's Hospital Address The Children's Hospital, 300 Longwood Avenue, Boston, Mass Their subject is "Foreign Bodies in the Air and Food Passages" Page 1054

WARREN, SHIELDS A B M D Harvard University Medical School 1923 Assistant Professor in Pathology, Harvard University Medical School Pathologist, New England Deaconess Hospital, New England Baptist Hospital, Collis P Huntington Memorial Hospital, and Pondville State Hospital Director, Massachusetts State Tumor Diagnosis Service Address 195 Pilgrim Road, Boston, Mass Associated with him are

GATES, OLIVE A B, M D Yale University School of Medicine 1929 Assistant Pathologist Collis P Huntington Memorial Hospital Assistant Director, Massachusetts State Tumor Diagnosis Service Address 695 Huntington Avenue Boston, Mass And

BUTTERFIELD, PAUL W A B M D Tufts College Medical School 1934 Intern in Pathology, Collis P Huntington Memorial Hospital Address 80 East Concord Street Boston Mass Their subject is "The Value of Histologic Differentiation of Basal Cell Carcinomas" Page 1060

VIETS, HENRY R. B.S., M.D. Harvard University Medical School 1916 Associate in Neurology, Harvard University Medical School Assistant Neurologist, Massachusetts General Hospital Address 6 Commonwealth Avenue, Boston, Mass. Associated with him is

MITCHELL, ROGER S. A.B., M.D. Harvard University Medical School 1934 Graduate Assistant in Neurology, Harvard University Medical School, at the Massachusetts General Hospital, February-August, 1936 Address 191 Glen Street, Glens Falls, New York. Their subject is "The Prostagmin Test in Myasthenia Gravis. Second Report." Page 1064

SPERBER PERRY A.B., M.D. New York University College of Medicine 1932 D.N.B. Resident Physician, New York City Hospital and New York County Penitentiary. His subject is "Treatment of Delirium Tremens with Sodium Evipal." Page 1065 Address 93 Lexington Avenue, Providence, R. I.

WHITNEY, EDWARD T. A.B., A.M. M.D. Harvard University Medical School 1924 Assistant Surgeon Boston Dispensary Surgeon New England Telephone and Telegraph Co. Address 587 Beacon Street Boston Mass. Associated with him is

CONSALES PETER A. M.D. Tufts College Medical School 1922 Junior Surgeon Boston Dispensary Address 481 Beacon Street Boston Mass. Their subject is "The Management of Patients with Varicose Veins." Page 1068

HAWES JOHN B. 2ND A.B. M.D. Harvard University Medical School 1903 Formerly Assistant Visiting Physician Massachusetts General Hospital Director, Pulmonary Clinic and Non-Pulmonary Clinic Massachusetts General Hospital Consultant in Diseases of the Lungs New England District United States Veterans Bureau Secretary Massachusetts Tuberculosis Commission Now, President of the Boston Tuberculosis Association Director Massachusetts Tuberculosis League, Rutland Cottage Sanatoria and National Tuberculosis Association Consultant, Beth Israel Hospital, Jordan Hospital Plymouth, and Henry Heywood Memorial Hospital Address 330 Dartmouth Street Boston, Mass. Associated with him is

STONE, MOSES J. M.D. Tufts College Medical School 1921 Assistant Professor in Diseases of the Chest Boston University School of Medicine Physician Chest Clinic Massachusetts Memorial Hospitals and Tuberculosis Clinics Boston Health Department Assistant Physician Beth Israel Hospital Address 330 Dartmouth Street Boston Mass. Their subject is "Progress in Tuberculosis, 1935-1936." Page 1074

## The Massachusetts Medical Society

### FOURTH ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning December 7

#### Bristol North

Thursday December 10 at 4 00 p. m. at the Morton Hospital Taunton Subject Heart Disease Treatment of Cardiovascular Emergencies Instructor W. D. Reid Arthur R. Crandell Chairman

#### Bristol South (Fall River Section)

Monday December 7 at 4 00 p. m. at the Stevens Clinic of the Union Hospital Fall River Subject Lung Disease Pneumonia and Its Complications Diagnosis and Treatment Instructor Roderick Heffron Howard P. Sawyer Co-Chairman

#### Bristol South (New Bedford Section)

Friday December 11 at 4 00 p. m. at St. Luke's Hospital New Bedford Subject Acute Abdominal Emergencies Instructor H. W. Clute Robert H. Goodwin Co-Chairman

#### Middlesex North

Friday December 11 at 7 00 p. m. at St. Joseph's Hospital Merrimack Street Lowell Subject Blood Diseases Diseases Affecting the White Blood Cells Leukemias Agranulocytosis Mononucleosis Instructor W. B. Castle Samuel A. Dibbins Chairman

#### Norfolk South

Monday December 7 at 8 30 p. m. at the Quincy City Hospital Quincy Subject Blood Diseases Diseases Affecting the White Blood Cells Leukemias Agranulocytosis Mononucleosis Instructor M. B. Strauss David L. Belding Chairman

#### Plymouth

Tuesday December 8 at 4 00 p. m. at the Brockton Hospital Brockton Subject Stomach and Duodenal Ulcer Diagnosis and Treatment Instructor T. V. Cunniff W. H. Pulsifer Chairman

#### Worcester North

Friday December 11 at 4 30 p. m. at the Burbank Hospital Fitchburg Subject Complications of Diabetes and Their Treatment Coma Insulin Reactions Surgery (Gangrene Carbuncle Etc.) Marriage and Pregnancy Tuberculosis and Heart Disease Instructor E. P. Joslin Edward A. Adams Chairman

## MISCELLANY

## CHILD HEALTH AND THE CHRISTMAS SEAL

BY LOUISE STRACHAN

*Director, Child Health Education, National  
Tuberculosis Association*

The smiling face of Santa Claus on the Christmas Seal this year reminds us that Christmas belongs to children. But to those familiar with the history of this little penny sticker, there is an even more poignant reminder of the intimate connection between the health of children and the very idea of having Christmas Seals at all!

It is thirty years ago since the Christmas Seal was introduced into the United States by Miss Emily P. Bissell of Delaware who began the sale of seals to raise money to care for the children in that state who had tuberculosis. She had established a little shack to care for these children, but money was sorely needed to keep it going. When she heard that in Denmark they raised money for the same purpose by selling penny Christmas stamps she seized the idea and put it into operation in Delaware. Later it became nation wide in scope and children in every state have benefited thereby. 'Behind the Christmas Seal' says Miss Bissell, 'I see thousands of little children, crippled and sickly who never had a chance for health and strength before, and millions of school children who are learning to be strong and vigorous all their lives long'. One of the most moving tales about that first Christmas Seal sale is that of the eager little newsboy who came into the office of Philadelphia's *North American*, the newspaper which helped Miss Bissell put over her seal sale so successfully. He had to stand on tiptoe to put his penny on the high marble counter, but his words, 'Gimme one, me sisters got it', are still heart moving.

Close on the heels of the launching of the tuberculosis campaign in this country came the establishment of open air schools for the care of delicate children many of whom were known to have been exposed to tuberculosis. Other children who appeared anemic, run down and in what was in those days believed to be a pretuberculous condition, were also sent to these schools. The use of height weight tables to determine the health status of children was very popular and youngsters 10 per cent or more underweight according to the tables, were automatically classified as pretuberculous and listed as candidates for the open air schools. It was in 1908 that the first school of this type was opened in Providence, Rhode Island and it was not long before others were scattered all over the country.

Fresh air, extra feeding and rest were the features of these open air schools and classes from the very beginning. At first, unbounded enthusiasm for the virtues of fresh air, cast into the background the other facts in the régime of the open air school

namely extra food and rest. But as research in the field of nutrition contributed a better understanding of food values and the needs, along this line, of growing children the emphasis shifted to nutrition. More recently a better appreciation of the seriousness of the fatigue problem in children has turned attention to the importance of rest.

In the meantime research and experimentation in the field of tuberculosis were constantly going on. Because it was known that tuberculosis is a communicable disease, that every case comes from another, efforts of research workers were bent on discovering some accurate diagnostic test which would uncover the early case. Tuberculosis is an insidious enemy and a routine physical examination rarely discovers the disease in its early stages. In 1907 von Pirquet, a Viennese physician, developed a skin test, using tuberculin which promised great things as a detector of childhood tuberculosis. Much experimentation was done with this both here and abroad but it was not until 1924 that the Massachusetts State Department of Health launched its ten year program for the discovery of tuberculosis in children. At first the children selected for examination were divided into three groups—contact cases, those 10 per cent or more underweight and children who looked sick. By 1927 when 50,000 children had been tuberculin tested the significant fact had been established that so called 'underweight' had nothing whatever to do with the presence of tuberculous infection. Children apparently healthy, not only up-to-weight but even overweight were found to have been infected with tuberculosis to a greater or less degree though there were no physical signs to give the slightest indication of this. As a result, reliance on weight tables as a guide in discovering children in need of protective care has been abandoned at least by those who keep in step with the ever-growing knowledge in the field of health.

In the past five years the use of the tuberculin test has spread widely over the country and is one of the major activities of the voluntary tuberculosis associations working with the health authorities and with organized medicine in an intensive effort to find the early cases.

The need for open air schools and classes has been steadily decreasing as our facilities for discovering early tuberculosis have been increasing. However their contribution to our better understanding of the hazards of childhood and of the need of all growing children for protective care is very great. We are beginning to realize that the school régime must be adapted to the health requirements of the individual child instead of the other way round. How foolish to wait until a child becomes debilitated before providing for his health needs! Prevention is better than cure and surely wants no defence!

And so it is that the health problems of delicate children have brought about better health provision for all children and the little penny Christmas Seal, through all the thirty years of its existence has served to protect and maintain child health in the United States.



## THE CHRISTMAS SEAL BIRTHDAY

The Christmas Seal Birthday Party will be held at luncheon Tuesday, December 8 at the Hotel duPont Wilmington Delaware Speakers will be Dr Thomas Parran Jr Surgeon General of the United States Dr Esmond R Long of Henry Phipps Institute Philadelphia who is President of the National Tuberculosis Association and Dr Kendall Emerson its Managing Director The toastmaster will be Leigh Mitchell Hodges the man who helped Miss Emily P Bissell to conduct the first Christmas Seal Sale in the United States

The cooperation of the physicians in Massachusetts in the successful conduct of the Christmas Seal Sale is greatly appreciated by all of the tuberculosis associations of the Commonwealth

## THE QUALIFICATIONS OF THE COMMISSIONER OF MENTAL DISEASES

At the meeting of the Boston Society of Psychiatry and Neurology on November 19 1936, the following resolution was passed

The Boston Society for Psychiatry and Neurology whose members for fifty years have advocated the highest standards for the care of the mentally ill in Massachusetts respectfully suggests to His Honor the Governor of Massachusetts that the man nominated as Commissioner for the Department of Mental Diseases be a man thoroughly trained by experience as an executive in a mental hospital and of such recognized professional ability as to have been qualified as an expert psychiatrist by the American Board of Psychiatry and Neurology'

## APPOINTMENT OF DR. JOHN HOMANS

Dr John Homans, clinical professor of surgery in the Harvard Medical School and surgeon to the Peter Bent Brigham Hospital has been appointed visiting professor of surgery in the Yale University School of Medicine and surgeon in-chief of the New Haven Hospital in place of Dr Samuel C Harvey who has leave of absence from November 1 to June 30—*Science* November 20 1936

## CORRESPONDENCE

### EXCITING CAUSES OF CANCER AND THE CANCER POTENTIAL

November 21 1936

Editor, *New England Journal of Medicine*

FOOD FOR THOUGHT ON THE CANCER SYMPOSIUM HELD AT THE BOSTON MEDICAL LIBRARY NOVEMBER 18 1936

Dr Greenough mentioned industrial irritants

It seems clear that trauma and occupational irritants can be considered only as exciting causes of cancer formation

That there must be a cancer potential not only in

the individual but in a particular organ or portion of that organ in a given individual is obvious

As an illustration A man in the late thirties working in a printing ink factory has been suffering from hoarseness for about a year and a half. All the employees in that factory look poorly, I was told. The ones I saw did. They must at times be inhaling some of the poisonous powder dust in spite of their wearing masks

The patient has been at work until a few weeks before I was called in to see him for the first time

Laryngeal examination revealed an extensive cancerous mass of the left side of the larynx. He also had some ascites and parenchymatous nephritis (Dr Greene) probable metastasis to the parenchyma of the kidneys

Now he is the only one of many employees in that factory who has developed cancer. It is not in the lungs but in the left side of the larynx.

While the avoidance of irritants may be a practical approach to the prevention of cancer, yet it does not solve the problem. We do not know all the irritants and at what degree they may become an exciting cause

Our ambition is to strike at a potential

Since many of the cancers are masses of rapidly proliferating cells in a region where they do not belong it may be the responsibility of the histologist to ascertain whether such foreign cells make their habitat in some tissue of a supposedly normal individual. These cells may become carcinogenic in the presence of an exciting cause

The hormone influence on the production of cancer in the human being (Drs Shear and Aub) has to be considered also as an exciting cause in the cancer potential individual. The clinical and physiologic data have to be evaluated

The human being seems to settle down to cancer. We talk of the cancer age when the body activities on the average are on the decline. The hormones therefore are on the decline and in certain cases are about to cease or have already ceased functioning

A third of the cancers in the female organs appear five years after the menopause

Another third in the ten year period are equally prevalent in the years before and after the menopause and the remaining third appear during the hormone activity (Dr Taylor)

We may say then that given an individual with cancer potential in a certain organ with existing irritants in that organ cancer will not develop so long as his hormones exert a normal physiologic influence. The normal cells will keep up their supremacy. With the decline of the hormone activity the cancerous cells get the upper hand

With much increased hormone activity the normal cells are overstimulated irritated and overburdened, and the cancer cells again exert themselves and their proliferation commences

JOSEPH PREN, M.D.

467 Commonwealth Avenue  
Boston, Mass

## THE LIST OF REPORTABLE DISEASES

The Commonwealth of Massachusetts  
Department of Public Health  
State House Boston

November 20 1936

Editor, *New England Journal of Medicine*,

At a recent meeting of the Public Health Council it was voted under the authority of Chapter III Section 6 that Pfeiffer Bacillus Meningitis should be added to the list of those diseases which are deemed to be dangerous to the public health and, therefore reported to local boards of health. At the same time it was voted that the name of Epidemic Cerebrospinal Meningitis that has heretofore been carried on the list should be changed to read Meningococcus Meningitis.

With these changes, the present list of reportable diseases is as follows

Actinomycosis  
Anterior Poliomyelitis —  
    a Paralytic  
    b Nonparalytic (preparalytic)  
Anthrax  
Asiatic Cholera  
Chickenpox  
Cholecystitis of Typhoid Origin  
Diphtheria  
Dog bite  
Dysentery —  
    a Amebic  
    b Bacillary  
Encephalitis Lethargica  
German Measles  
Glanders  
Gonorrhea  
Hookworm Disease  
Infectious diseases of the eye —  
    a Ophthalmia Neonatorum  
    b Suppurative Conjunctivitis  
    c Trachoma  
Leprosy  
Lobar Pneumonia  
Malaria  
Measles  
Meningitis —  
    a Meningococcus Meningitis  
    b Pfeiffer Bacillus Meningitis  
Mumps  
Paratyphoid Fever A  
Paratyphoid Fever B  
Pellagra  
Plague  
Rabies  
Scarlet Fever  
Septic Sore Throat  
Smallpox  
Syphilis  
Tetanus  
Trichinosis  
Tuberculosis (all forms)  
Typhoid Fever

Typhus Fever  
Undulant Fever  
Whooping Cough  
Yellow Fever

Very truly yours

HENRY D CHADWICK, M.D.,  
*Commissioner of Public Health*

## RECENT DEATH

McKEEN—SYLVESTER FORSHAY McKEEN of 96 Dean Road Brookline Massachusetts, died at his home November 29 1936. After Dr McKeen graduated from the University of New Brunswick, he entered the Harvard Medical School and graduated there from in 1896. He served his internship at the Boston City Hospital and after postgraduate study in Vienna carried on practice in Allston until 1923 when he moved to Brookline.

Dr McKeen joined the Massachusetts Medical Society in 1897 and for many years was a member of the Council and served on the important Committee on Ethics and Discipline.

His widow Mrs Teresa McKeen two sons Reginald Forster and Edward Forster and a daughter Anita McKeen survive him.

## NOTICES

## BOSTON DISPENSARY

25 Bennet Street Boston

## MEDICAL CONFERENCE PROGRAM

Lecture Room Second Floor

9 10 a m December 1936

Thursday December 3—Indications for Short Wave Therapy Dr H G Brugsch

Friday December 4—Blood Lipids in Patients with Angina Pectoris Dr David Davis

Saturday December 5—Hospital Case Presentation Dr S J Thannhauser

Tuesday December 8 — X Ray Demonstration Dr Alice Ettinger

Wednesday December 9—Hospital Case Presentation Dr S J Thannhauser

Thursday December 10 — The Capsule of Pneumococcus and Its Relation to Immunity (Review of literature) Dr J G Blaine

Friday December 11—Observations on Symptoms of Cholelithiasis Dr Robert Zollinger

Saturday December 12—Hospital Case Presentation Dr S J Thannhauser

Tuesday December 15—Blood Clinic Dr William Dameshek.

Wednesday December 16—Hospital Case Presentation Dr S J Thannhauser

Thursday December 17—Social Service Case Presentation Miss E R Canterbury

Friday December 18—Subject to be announced Dr Allan M Butler

Saturday December 19 — Hospital Case Presentation Dr S J Thannhauser

## THE BOSTON CITY HOSPITAL

## MONTHLY CONFERENCE OF CLINICAL PATHOLOGY

A monthly conference of clinical pathology will be held at the Hospital on Wednesday December 9 at 12 o'clock noon in the Pathological Amphitheater

JOSEPH E. HALLISEY, M.D.,  
*Secretary Medical Staff*

MEDICAL CLINIC AT THE PETER BENT  
BRIGHAM HOSPITAL

At 3 30 p. m. on Thursday December 10 in the Amphitheater of the Peter Bent Brigham Hospital Dr. George R. Minot, Professor of Medicine Harvard Medical School and Director Thorndike Memorial Laboratory and Visiting Physician Boston City Hospital will give a medical clinic. To it are cordially invited practitioners and medical students.

REPORTS AND NOTICES  
OF MEETINGSOFFICERS OF THE MASSACHUSETTS SOCIETY  
FOR MENTAL HYGIENE

At the Annual Meeting of the Massachusetts Society for Mental Hygiene held November 24, 1936 the following officers were chosen: President Dr. Donald Gregg, vice-president Dr. Walter F. Dearborn, secretary Dr. Charles E. Thompson, treasurer Romney Spring, assistant treasurer Clarence G. McDavitt, executive committee Dr. C. Macfie Campbell, Dr. William Healy, Dr. Lawrence K. Lunt, the Rev. Walter McGuinn, Dr. Abraham Merson, Malcolm S. Nichols, Herbert C. Parsons, Mrs. E. Lawrence Shaw and Dr. Payson Smith. Directors elected are the following: Miss Mary Vida Clark, Miss Katherine C. Coveney, Dr. Homer Page, Dr. William Healy, Dr. Roger I. Lee, the Rev. Walter McGuinn, Dr. Winfred Overholser, Dr. Austen Fox, Riggs, Arthur G. Rotch, Dr. Frederick F. Russell, Mrs. E. Lawrence Shaw, Dr. A. Warren Stearns and Miss Mary Lee Ware.

## HARVARD MEDICAL SOCIETY

The first meeting of the Harvard Medical Society for the current academic year was held Tuesday evening October 13, 1936 at the Peter Bent Brigham Hospital. Dr. Elliott C. Cutler presiding. The medical case was presented by Dr. Joseph Miller. A twenty-year-old white female entered the hospital with the complaint of increasing prominence of the left eye of four months' duration. She had noted a slight tendency toward excessive perspiration since childhood and a slight enlargement of her neck for four years. She had been seen in the outdoor department one and a half years previously at which time a diffuse enlargement of the thyroid gland was noted and the basal metabolic rate was found to be zero. A diagnosis of colloid goiter was made at that time. With the onset of the increasing prominence of the left eye she again visited the

outdoor department, and a history of slight increase in nervousness, intolerance to heat, occasional tremor of the hands and palpitation, slight increase in appetite and a gain of ten pounds of weight during the preceding six months was elicited. Four determinations of the basal metabolic rate gave normal findings. Four determinations of the blood cholesterol showed levels ranging from 77 to 156 mg. per cent (normal level between 150 and 200 mg. per cent), values showing definite hypcholesterolemia. Physical examination at time of entry to the hospital showed a restless girl with definite exophthalmos of the left eye which showed a marked lid lag. The thyroid gland was diffusely enlarged, slightly more so on the left than on the right, and there was a faint bruit heard over its lower portion. The heart was not enlarged and its rate varied from 80 to 110 beats per minute. The blood pressure was 140 mm. of mercury systolic and 60 mm. of mercury diastolic. There was slight fine tremor of the hands on extension. The lower half of the body was slightly larger than the upper half. Laboratory studies showed the urine hemoglobin and red blood cell count to be normal. The white blood cell count was 19,000 on admission but fell to normal levels later. A lumbar puncture was negative. X-ray studies of the skull showed no abnormality of the bones and the pituitary fossa was within normal limits. There was no evidence of substernal goitre by x-ray. The blood cholesterol was found still to be lowered. Several determinations of the basal metabolic rate gave values ranging from plus three to plus seven. Lugol's solution was administered orally with subjective decrease in nervousness and the basal metabolic rate was lowered within a week to minus two, later to minus 14.

Dr. E. C. Cutler in discussing the case suggested that the normal basal metabolic rate for this patient might be minus 15. Dr. S. A. Levine stated that inasmuch as all the symptoms pointed to hyperthyroidism, he would advise thyroidectomy, even though the basal metabolic rate was not elevated. Dr. Marshall N. Fulton remarked that a survey of the literature revealed a well-recognized group of patients with the symptoms of hyperthyroidism without elevation of the basal metabolic rate. He commented on the extremely labile pulse rate exhibited by this patient, variations between 67 and 120 beats per minute being noted. He also believed that her symptoms might be benefited by operation.

Dr. I. Abel presented the surgical case. A 56-year-old white female was first seen 12 years previously complaining of pain in the right lower jaw. At that time the thyroid was noted to be enlarged and the basal metabolic rate was found to be plus 14. Seven years ago she experienced mild cardiac decompensation which responded well to digitalis therapy. Two years ago alcohol injection was performed because of the persistent pain in the jaw. One year ago the right gasserian ganglion was removed for the same reason. At that time the basal metabolic rate

was found to be minus 18, and thyroid extract was administered, but was soon discontinued because of the condition of the cardiovascular system. Six months previously she experienced a mild cerebral accident. One month ago she entered the hospital on the advice of her private physician, at which time her pulse was found to be quite slow (60 beats per minute), her temperature was only 97 degrees Fahrenheit, and the thyroid gland was noted to be large, hard, nodular, and fixed to the surrounding structures. The basal metabolic rate was minus 28. The diagnosis lay between Riedel's struma and primary carcinoma of the thyroid. Total thyroidectomy was performed. The gland was found to be very hard, smooth, enlarged, and attached to the surrounding muscles. The pathologic report was Riedel's struma.

Dr. Cutler discussed the case, and referred to the article of Riedel in the *Verhandl. d. deutsch. Gesellsch. f. Chir.*, 1896, in which he described several cases of acute and chronic inflammation in enlarged thyroid glands. He also referred to the work of Hashimoto, who described early cases of thyroiditis occurring in patients over 40 years of age, six times more frequently in females than in males, and usually in stout people. His article was published in the *Arch. f. Klin. Chir.*, 97:219, 1912.

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X-ray studies of the appearance of the centers of ossification and progressive maturation of epiphyses in normal healthy children have shown these skeletal elements to be real "time tables of maturation." The relation to chronologic age in children who have died from lingering disease differs from that in well children. Long-continued ill health is reflected by changes in the bones. Children on the poverty line are behind well-situated children in their age relationship both of growth and maturation.

This observation is confirmed experimentally by appropriate disturbance of nutrition in young guinea pigs.

The brains of thoroughly well children killed accidentally show progress in development much advanced over those of children of identical age dying from protracted disease. By the age of six years a child's brain is practically adult in size and pattern, the period of greatest velocity in developmental progress being from birth to two years. Thus in order to inhibit the development of the brain at adverse situations must occur before the age of two years.

The anthropologic method and approach allow the determination of the period in life when ill health strikes, and offer some quantitative criteria of the "degree of health."

#### WILLIAM HARVEY SOCIETY

The next meeting of the William Harvey Society will be held Friday, December 11, in the Auditorium of the Beth Israel Hospital, Boston, at 8:00 p. m.

#### PROGRAM

Speaker: Dr. Henry E. Sigerist, Professor of the History of Medicine, Johns Hopkins University.

Subject: The Social Problems Confronting Medicine Today.

Chairman: Dr. Benjamin Spector, Professor of Anatomy, Tufts College Medical School.

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The course consists of four lectures, followed by general discussion to any or all of which physicians, who are not members and nurses, are invited.

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The speaker will be Dr. Maurice Fremont Smith, Chief Psychiatrist of the Outpatient Department, Massachusetts General Hospital.

His subject will be Mind Body Relationship  
The Belmont Doctors Club has been invited.  
The Sanatorium will serve a Dutch supper after  
the meeting

All physicians are invited to attend

FRANK H GERREY M.D., *President*,  
SIDNEY M SIMONS, M.D., *Secretary*

### NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held at the Boston City Hospital in the Amphitheater of the Mallory Institute of Pathology on Monday December 14 1936 at 8 15 p.m.

#### PROGRAM

1 Demonstration of Specimens in Relation to Symptoms A Subaortic Stenosis B Cardiac Perforation from Solitary Abscess Dr Soma Weiss

2 Circulatory Effects of Nitroglycerine Dr James G M Hamilton

3 The Effect of Thrombophlebitis on the Venous Valve Drs Edward A Edwards and Jesse E Edwards

4 The Relation of the Nutritional Deficiencies to the Cardiovascular System

A. The Relation of Vitamin C to Rheumatic Fever Dr James M Faulkner

B The Clinical Features and the Characteristics of the Disturbance of the Heart and of the Circulation in Nutritional Deficiencies Dr Robert W Wilkins

C Vitamin B<sub>1</sub> Deficiency and the Heart in the Rat Drs Paul M Zoll and Florence W Haynes

D Structural Characteristics of the Heart in Deficiencies and Therapy Dr Soma Weiss

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#### PROGRAM

Presentation of Cases

The Physiology of the Breast. By Edwin B Astwood M.D., The Johns Hopkins Hospital, Baltimore, Maryland

Medical students and physicians are cordially invited to attend

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### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY DECEMBER 7 1936

##### Monday December 7—

4 p.m. Physicians and medical students are cordially invited to attend a clinic presented by the Medical Surgical and Orthopedic Services of the Infants and Children's Hospitals in the Amphitheater of the Children's Hospital

##### Tuesday, December 8—

\*9 a.m. - 10 a.m. Boston Dispensary 25 Bennet Street Boston X-Ray Demonstration. Dr Alke Ettinger

11 30 a.m. Massachusetts General Hospital Eye Nerve Conference Outpatient Department

\*8 15 p.m. Harvard Medical Society Peter Bent Brigham Hospital Amphitheater (Shattuck Street entrance)

##### Wednesday December 9—

8 a.m. Massachusetts General Hospital. Grand Rounds Orthopedic Department

\*9 a.m. - 10 a.m. Boston Dispensary 25 Bennet Street Boston. Hospital Case Presentation Dr S J Thannhauser

12 m. Boston City Hospital Monthly Conference of Clinical Pathology Pathological Amphitheater

11 2 m. Clinico-Pathological Conference Children's Hospital Amphitheater

4 p.m. - 5 p.m. Surgical Pathological Conference Dr Cutler and Dr Wolbach Peter Bent Brigham Hospital

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9 a.m. Massachusetts General Hospital Surgical Grand Rounds Surgical Amphitheater

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9 15 a.m. Massachusetts General Hospital Neurological Conference Ether Dome

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##### Friday December 11—

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10 a.m. Massachusetts General Hospital Fracture Rounds

12 m. Massachusetts General Hospital Clinical Meeting of the Staff of the Children's Medical Service Ether Dome

8 p.m. William Harvey Society Auditorium of the Beth Israel Hospital Boston

##### Saturday December 12—

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\*10 a.m. - 12 m. Staff Rounds at the Peter Bent Brigham Hospital Conducted by Dr Henry A Christian

\*Open to the medical profession

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December 3—Faulkner Hospital Clinical Meeting 5 p.m.

December 3 5—Annual Conference of the National Society for the Prevention of Blindness Columbus Ohio

December 3 19—Boston Dispensary Medical Conference Program. See page 1094

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December 15—South End Medical Club See page 1096  
 December 15—Massachusetts Eye and Ear Infirmary  
 Monthly Clinico-Pathological Conference See page 949  
 issue of November 12  
 February 25, 26, 27, 1937—The New England Hospital  
 Association Hotel Statler Boston  
 March 30, April 2, 1937—First International Conference  
 on Fever Therapy Postponement notice See page 52  
 issue of July 2  
 April 21, 24, 1937—American Society for Experimental  
 Pathology See page 1075 issue of May 21  
 October 25, 29, 1937—American College of Surgeons Chi-  
 cago Illinois

## DISTRICT MEDICAL SOCIETIES

### FRANKLIN DISTRICT MEDICAL SOCIETY

Will meet at the Weldon in Greenfield at 11 a. m. the  
 second Tuesdays of January, March and May  
 CHARLES MOLINE, M.D., Secretary

Sunderland

### MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

January 13, 1937—Bear Hill Golf Club Stoneham  
 March 16, 1937—Danvers State Hospital Danvers  
 May 11, 1937—Bear Hill Golf Club, Stoneham

KENNETH L. MACLACHLAN M.D. Secretary  
 1 Bellevue Avenue, Melrose

### NORFOLK DISTRICT MEDICAL SOCIETY

January 19, 1937—8 15 p. m. The Peter Bent Brigham  
 Hospital Communications and Case Presentations by the  
 Staff Suggested title—Abdominal Pain from the Medi-  
 cal and Surgical Standpoint. Details of program to be  
 announced

February 23, 1937—Time, place and details of program  
 to be announced

March 30, 1937—8 15 p. m. New England Deaconess  
 Hospital A Symposium on Diabetes entitled A Survey  
 of the Diabetic Work of the George F. Baker Clinic  
 in the New England Deaconess Hospital Communica-  
 tions and Case Presentations by the Staff Drs. Elliott P.  
 Joslin, Howard F. Root, Priscilla White, Alexander Marble  
 and Allen P. Joslin

May, 1937—Annual Meeting Details to be announced

Note The Censors will meet for the examination of  
 candidates on the first Thursday of May 1937. Fee of  
 \$10.00 is payable at the time of examination. Application  
 blanks may be obtained by writing the Secretary fur-  
 nishing name, address and name of school of graduation  
 in medicine. Application must be made at least three  
 weeks prior to date of examination. Candidates whose  
 applications are on file will receive proper notices

FRANK S. CRUICKSHANK M.D. Secretary  
 1247 Beacon Street Brookline

### PLYMOUTH DISTRICT MEDICAL SOCIETY

January 21, 1937—11 a. m. Bridgewater State Farm  
 March 18, 1937—11 a. m. Brockton Hospital  
 April 15, 1937—Annual Meeting 11 a. m. Duxbury Hos-  
 pital  
 May 20, 1937—11 a. m. Lakeville State Sanatorium

FRED F. WEINER M.D. Secretary  
 231 Main Street Brockton

### SUFFOLK DISTRICT MEDICAL SOCIETY

January 27, 1937—Boston Medical Library 8 15 p. m.  
 Joint Meeting with the Boston Medical Library Anthro-  
 pology Dr. Carleton S. Coon

March 31, 1937—Boston Medical Library 8 15 p. m.  
 Social Insurance—It Affects the Medical Profession  
 Dr. Charles E. Mongan Discussion Dr. Channing Frothing-  
 ham

April 28, 1937—Annual Meeting Boston Medical Library  
 8 15 p. m. Problems in Surgical Diagnosis Dr. How-  
 ard M. Clute

CONRAD WESSELHOEFT M.D. President  
 CHARLES C. LUND M.D. Secretary

### WORCESTER DISTRICT MEDICAL SOCIETY

December 9—St. Vincent Hospital Worcester Mass.  
 6 15 p. m. Dinner—complimentary by the hospital 7 30  
 p. m. Business session and scientific program

January 13, 1937—Worcester City Hospital Worcester  
 Mass. 6 15 p. m. Dinner—complimentary by the hospital.  
 7 30 p. m. Business session and scientific program

February 10, 1937—Worcester State Hospital Worcester  
 Mass. 6 15 p. m. Dinner—complimentary by the hospital  
 7 30 p. m. Business session and scientific program

March 10, 1937—The Memorial Hospital Worcester  
 Mass. 6 15 p. m. Dinner—complimentary by the hospital  
 7 30 p. m. Business session and scientific program

April 14, 1937—Worcester Hahnemann Hospital, Worces-  
 ter Mass. 6 15 p. m. Dinner—complimentary by the  
 hospital. 7 30 p. m. Business session and scientific pro-  
 gram

May 6, 1937—At 4 30 in the rooms of the Worcester  
 Medical Library Inc. at 34 Elm Street, Worcester will  
 be held the spring meeting of the Board of Censors

Wednesday Afternoon and Evening, May 12, 1937—An-  
 nual Meeting Time and place for this meeting will be  
 announced in an early spring issue of the Journal.

ERWIN C. MILLER M.D., Secretary  
 27 Elm Street, Worcester

## BOOK REVIEWS

Diseases of the Nails V. Pardo-Castello 177 pp  
 Springfield and Baltimore Charles C. Thomas  
 \$3.50

Books devoted to nails are rare in the English  
 language and the author deserves much credit for  
 bringing together so much material regarding nails  
 and so many references to articles concerning nails  
 and their diseases. The book considers the various  
 types of nail conditions under two headings—the  
 various affections which are peculiar to the nails,  
 and the various conditions appearing in the nails in  
 connection with systemic diseases. The congenital  
 affections dystrophies and roentgen ray treatment  
 are all given adequate consideration. The pictures  
 are excellent.

Dr. Colwell's Daily Log for Physicians A Brief  
 Simple Accurate Financial Record for the Physi-  
 cian's Desk Champaign Colwell Publishing Com-  
 pany \$6.00

This financial record for physicians is a substan-  
 tial looseleaf book measuring 8½ x 10 inches. It  
 consists chiefly of pages for entry of services ren-  
 dered each day. There are also sections for entry  
 of special services such as Inoculations, Operations  
 and Deliveries. There is a summary sheet at the  
 end of each month with spaces for entering not only  
 receipts but the various items of expense incurred  
 in carrying on the office. These figures would prove  
 very helpful in making out the doctor's income tax.  
 The book appears to be practical well arranged  
 and likely to be very useful particularly to the gen-  
 eral practitioner.

The Adrenals Arthur Grollman 410 pp. Balu-  
 more The Williams & Wilkins Company \$5.00

The author in the preface states: "An attempt  
 has been made to analyze the great accumulation  
 of literature on the subject of the adrenals and pre-  
 sent a working hypothesis from which the reader  
 may start on his own efforts."

He has accomplished this quite successfully. The  
 reader may be a little disturbed at finding many  
 features in the working hypothesis at variance with  
 the opinion of other workers in the field and should  
 reserve final judgment on many questions for fur-  
 ther work. Nevertheless the arguments are lucid,  
 the bibliography is excellent and the book should  
 be valuable to anyone who wants to familiarize  
 himself with the recent advances in the adrenal  
 gland.



# The New England Journal of Medicine

VOLUME 215

DECEMBER 10, 1936

NUMBER 24

## NEW ENGLAND SURGICAL SOCIETY

### THE TREATMENT OF ELEPHANTIASIS OF THE LEGS\*

#### A Preliminary Report

BY JOHN HOMANS, M D †

**E**LEPHANTIASIS of the legs, though uncommon enough in temperate regions, is less rare than is generally supposed. The idiopathic or sporadic form, known as elephantiasis nostra, occurs more frequently than the familial form, usually called Milroy's or Meige's disease, which clinically and pathologically it resembles. The disease appears most often near the time of puberty, as if some glandular influence or the rapid elongation of the body which occurs at that period had something to do with its establishment. However, occasionally it appears in infancy and it has even been known to begin as late as the fifth decade.

Elephantiasis is distinguished by a very gradual onset of swelling in one or both legs. The edema first appears at the ankle and mounts, in the course of years, until the entire leg is involved, the upper limit being the inguinal ligament in front and the fold of the buttock behind. There are mild cases and severe ones. A mild case is controllable by bandaging and even if left to itself without bandaging may require ten years or more for its full development. A severe case may reach a very high degree of tense swelling in the course of a year or two. As the disease advances, the skin thickens and the subcutaneous tissues gradually harden until pitting on pressure can no longer be demonstrated. Finally, the superficial parts, especially near the ankle, are thrown into great folds with deep creases between.

In occasional and unpredictable instances, there will set in, once the leg has become tensely swollen, the remarkable febrile attacks which are so apt to complicate every sort of elephantiasis, tropical or other. These attacks are marked by heat, widespread redness and additional swelling of the whole limb, by a rapid rise in temperature, usually preceded by a chill, and are completely self-limited. Though often described as erysipelas, the redness and swelling do not creep, but come on at one moment. Ab-

cess formation never occurs. As a rule, the total duration of any one attack is not over four to five days and though no immediate after-effects are evident, a long series of these acute febrile upsets certainly aggravates the disease. Their cause has always been obscure, but the presence in the tissues of a nonsuppurative streptococcus has, in recent years, generally been admitted. Interestingly enough, in the experimental form\* of the disease (in the dog), it has been shown that recurrent infections exactly similar to those of human beings occasionally set in. In these attacks, a streptococcus can be secured from the tissue fluids, but only for a few hours at the height of any attack.

In fully developed elephantiasis, the tissue fluids accumulate in the leg, as it were in a great sponge, the lowest portion of the sponge having the largest meshes and being the most thoroughly distended and fibrosed, while the upper part is little changed from the normal. Probably in the very mildest form of the disease, some valved lymphatic channels capable of transmitting fluid remain, especially in the thigh. In the severest form, there is no doubt that everything resembling a lymphatic vessel is destroyed. The lymphatics being destroyed, the tissue fluids circulate purely by gravity through dilated spaces in the connective tissue (whether or not lined with endothelium), that is, if the leg is raised up above the level of the body, the fluids will quickly flow into the body, and, if the leg is again lowered, the fluids flow back again. This back and forth flow may occasionally be demonstrated by the injection of certain dyes beneath the skin.

To show the remarkable capacity of the elephantiasic tissues for holding fluid, the case of Mrs H U is cited.

Mrs H U a woman aged 36 years whose disease began at 25 and was fully developed at 36 came under observation. Her lower leg presented the appearance of a great sac and was utterly unwieldy. By my advice, in preparation for operation, she elevated her leg for several days at home. Before doing this she weighed herself and discovered that the differ-

From the Peter Bent Brigham Hospital.  
Read by title at the Annual Meeting of the New England Surgical Society at Bridgeport Conn. September 25 1936.

†Homans, John—Clinical Professor of Surgery Harvard University Medical School. For record and address of author see This Week's Issue page 1133.

ence in weight before and after elevation was roughly 40 pounds. Forty pounds represents about 5 gallons. She, therefore, had a 5 gallon leg.



FIGURE 1 Elephantiasis nostra in a young woman (H. U.) On the left the leg before elevation. On the right, the leg after elevation for a week. Loss of 40 lbs. in weight during this period, which was marked by excessive urination. See figure 4 showing postoperative condition.

As for the disposal of this large amount of fluid, should it run out of the leg into the body, it has several times been observed that, as the leg empties itself, the corresponding flank and back of the trunk toward the shoulder become considerably swollen and at the same time the patient notices that the output of urine is astonishingly increased. The fluid, then, flows into the lymphatics draining the upper half of the body and is soon excreted.

The sort of elephantiasis pictured here is decidedly different from the kind that occasionally develops as a result of repeated infections, such for instance, as may be associated with chronic ulcers, with epidermophytosis and very rarely with postphlebitic states. Whereas, in the one case, the febrile attacks follow the establishment of chronic lymph stasis, in the other, the leg is not enlarged previous to the infectious episodes and only becomes elephantiasic as the violent attacks are many times repeated. The distinction between the two sorts is usually clear, but I have under my care one patient whose elephantiasis dates from a femoral lymphadenitis. Since the removal of glands from his groin the patient has suffered many febrile attacks, yet without any sign of ulceration or any other peripheral lesion. In this case then it is difficult to say whether the attacks are an effect or a cause.

An outspoken example of the ulcerated type in which repeated infections are clearly the cause of the swelling is the following:

Mrs. I. P., an obese woman, 36 years of age. Four years before coming under observation, she suffered from a typical milk leg on the left. At this time the right leg seemed to be only slightly affected but 6 months later, an ulcer appeared on the inner face of the lower right leg, the left leg being quite normal. Since then, this and other ulcers have persisted and appear to be the cause of very violent erysipelas-like attacks, confined to the leg from the knee down. As time has gone on the whole leg, thigh included, has enlarged but only the lower leg is solidly indurated. Curiously enough, the protein percentage in this tissue fluid is very low by contrast with that of elephantiasis nostra.

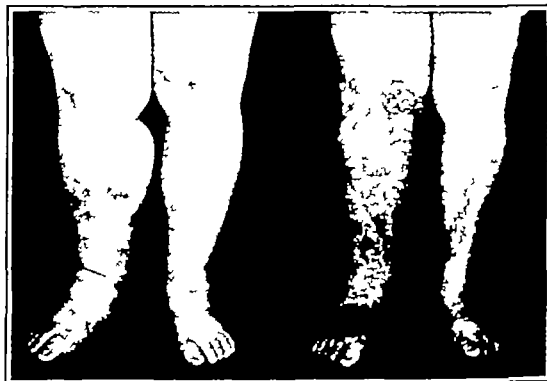


FIGURE 2 Elephantiasis secondary to ulceration and infection in a young woman (I. P.). On the right the leg just after a violent febrile attack.

Before taking up the surgery of elephantiasis nostra, that is, the "idiopathic" form, a word might be said about the treatment of the ulcerated, primarily infected variety just described. Clearly, every effort ought to be made to heal ulceration and abolish infection. In one instance, the disease seems to have been halted by treating the evident epidermophytosis. In another, a lumbar sympathetic neurectomy has, for the time being at least, caused the chronic ulcers to heal and halted the disease. But, what to do next? The leg is still swollen and unwieldy. Can it be subjected to the plastic operations suitable to elephantiasis nostra? My own experience does not permit me as yet to answer that question.

#### THE SURGICAL TREATMENT OF ELEPHANTIASIS NOSTRA

It has already been explained that, in the elephantiasic leg, there are no longer present any functioning lymph vessels. Fluid flows back and forth through the dilated tissue spaces by gravity. The enlargement is altogether confined to the tissues superficial to the muscular anastomosis, the deeper parts showing no swelling. At first sight it might seem as if these deeper, muscular parts were being normally drained of their lymph and as if Kondoleon's idea of conducting the superficial fluids beneath the aponeurosis might have some merit. But

actually the muscles have no lymph and my own search for lymphatics about the femoral vessels, by the use of dyes, has been quite fruitless. Moreover, explorations of the pelvis in elephantiasis have shown that the great lymph trunks which wind about the iliac vessels and through which all the tissue fluid from the leg must pass are fibrosed and at least partly, if not wholly, functionless. Therefore, upon every ground, there is reason to believe that no advantage can accrue from attempting to introduce lymph into the tissues beneath the muscular aponeurosis, as a matter of fact, no such operation is possible. Nor is there any advan-

the cause of the lymph stasis an obstruction perhaps not complete enough to prevent an effective lymph drainage in early life but sufficient to cause a breakdown later. The explorations that I have made up to the present time have so far failed to reveal any such obstruction. On three occasions I have searched thoroughly along both sides of the pelvis and although the lymphatics on the elephantiasic side were clearly fibrosed, thickened and as a rule functionless, there was no clear proof of an obstruction above. It is therefore impossible to say what actually is the cause of lymph stasis, but further explorations, both within the pelvis and in the leg it-

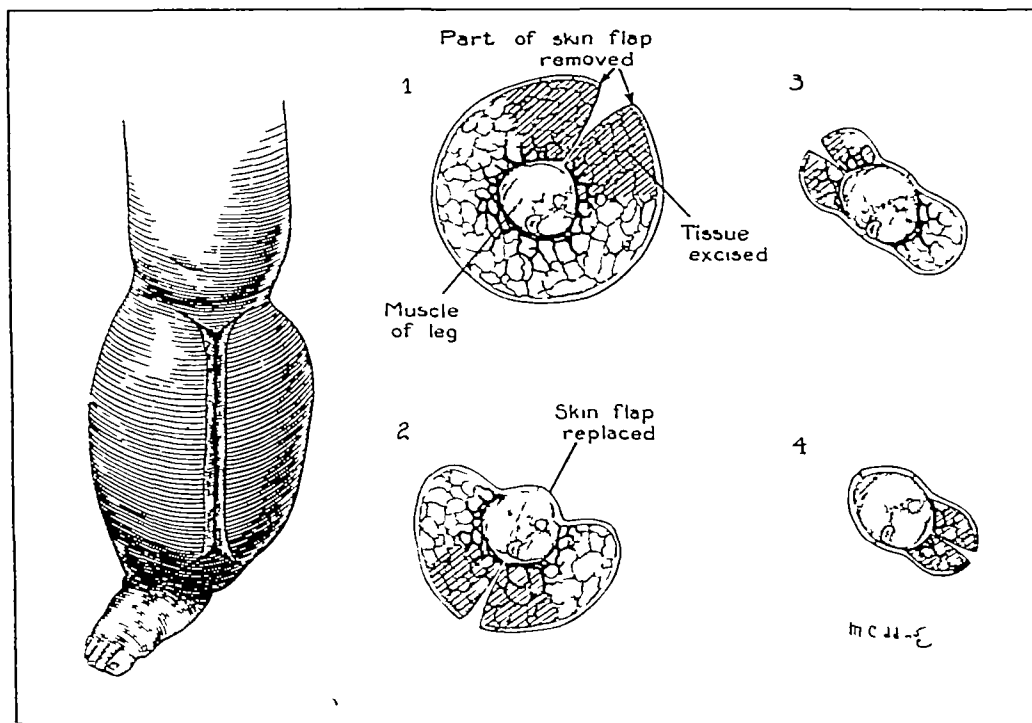


FIGURE 3 The plastic operation for elephantiasis (4 steps). On the left, the first incision. The cross sections show the tissue to be excised (shaded) and approximately the amount of skin flap removed (shaded) at each operation. Operations 3 and 4 are performed three months after 1 and 2. The heavy black shading indicates the region of thickest scar tissue that often is permeated with lymph-filled spaces.

tage in endeavoring to establish a continuous channel in the superficial tissues of the leg toward the body, since dilated spaces capable of carrying lymph by gravity but of course lacking in the valvular mechanism are already present. Probably the attempt to make a connection between the superficial tissues and the deeper parts in well-established elephantiasis is like attempting to connect the upstairs and downstairs plumbing when the outlet to the street is obstructed.

It might be supposed that in such a disease one would be able to find in the pelvis or at the groin where all the lymphatics of the lower limb come together some sort of obstructive lesion as

self, may perhaps in time reveal the causal factor or factors.

Treatment must be based upon such considerations.

In the *mild cases*, the edema is controllable by bandaging or is so far controllable that the leg never becomes unwieldy. If the leg is elevated at night the fluid which *does* accumulate in the daytime disappears by morning.

In the *serious cases*, the limb becomes unwieldy and demands operative treatment. Operations today differ somewhat from the original procedure of Kondoleon the object of which as already explained now appears to be unattainable. As a matter of fact this operation ac-

tually removes a considerable amount of tissue in which fluid can form and accumulate, but this has in the past been rather accidental and the modification of Sistrunk is only slightly superior to the old plan Auchincloss, who, in treating the tropical form of the disease, tried to remove as large an amount of filaria-containing tissue as possible, made use of what seems to me a sounder principle, namely, to make long, thin, longitudinal flaps of skin and subcutaneous tissue

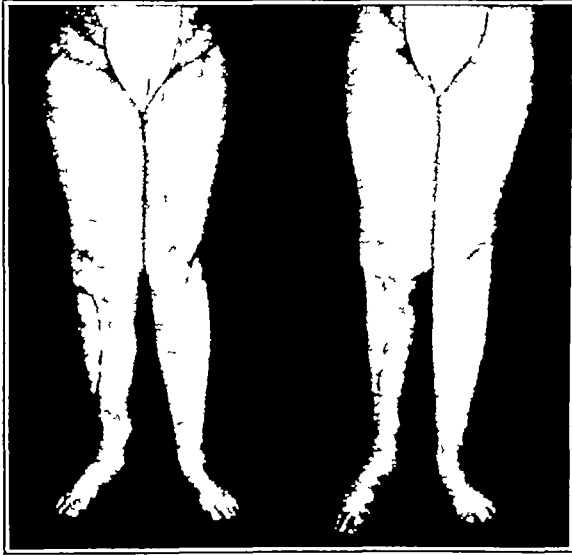


FIGURE 4 The same patient (H. U.) shown in figure 1. On the left operations 1 and 2 have been completed. On the right operations 3 and 4 performed eight months later have been completed. The thigh is reduced in size though it has never been subjected to operation.

which can be replaced upon the parts beneath the muscular aponeurosis, the intervening lymph-soaked tissue being removed. He confined his operation to the lower leg, regarding a continuous incision up to the body as not essential. However, Auchincloss did not make a definite proposal to do away with *all* the subcutaneous tissue of the leg, though he hints that this might be advisable. Actually, if the skin and a very thin layer of subcutaneous tissue are dissected up in a series of operations and replanted upon the approximately normal muscle, bone and tendon-sheath beneath the aponeurosis, there is very little need, in most cases, of carrying this operation into the thigh, for, if the formation of tissue fluid in the lower leg is reduced to a minimum, there will be less fluid to travel toward the body when the patient lies down, and accordingly there will be less swelling of the thigh. Meanwhile, the fluid which accumulates in the thigh itself, having a short course to take to reach the body, will flow on as before. Indeed, it has proved true in my hands that, once an effective series of operations is done upon the lower leg, the enlargement of the thigh is decidedly reduced.

The series of operations required is pictured in the accompanying sketches. Each is performed with the aid of an Esmarch bandage. At the first operation, long flaps are outlined on the anterointernal surface of the calf and the dissection is carried down at once through the aponeurosis. Thick flaps are then turned up, including the aponeurosis, so as to expose at least a quarter of the circumference of the leg. The actual, thin skin flaps are then prepared and the great mass of lymph-soaked tissue thus isolated by the dissection is excised. The Esmarch bandage which has controlled bleeding up to this point is now removed, the bleeding points, which are represented principally by a row of perforating arteries, are picked up and tied and the flaps are inspected to see whether their vascularity appears to be satisfactory. Should the edges appear cyanotic or unduly pale, it is easily possible to cut from them a considerable amount, for of course there is an excess of skin available. The flaps are then tacked to the deep parts with a series of fine chromic stitches so as to abolish dead space. Naturally, the long broad hollow thus formed in the leg must be carefully padded with gauze and solidly bandaged, so that the fluid from adjacent parts will not flow into it. Once it has healed in place, the skin will not float up again.



FIGURE 5 Elephantiasis nostras in a 15 year old boy. The first two plastics have been performed. Notice the scar of the first plastic across the foot. A second was carried out 3 months later at a higher level on the foot at the same time that plastics 3 and 4 (not shown here) were performed on the leg.

If there is a good deal of swelling of the foot, it may be necessary to perform similar operations there, but on a smaller scale, making the first incision *across* the foot and nearest to the toes, for the flaps turned up upon the foot can-

not be immediately adjacent to the lower end of the longitudinal flaps made at the same sitting. At a later date, when the third pair of flaps are being turned up and the first flaps upon the foot have acquired a blood supply, the second plastic can be done upon the top of the foot. No more than these two will usually be necessary.

Perhaps a week after the first operation upon the anterointernal face of the calf, a second plastic is carried out on the opposite, or postero-external face. In this, it is important to preserve

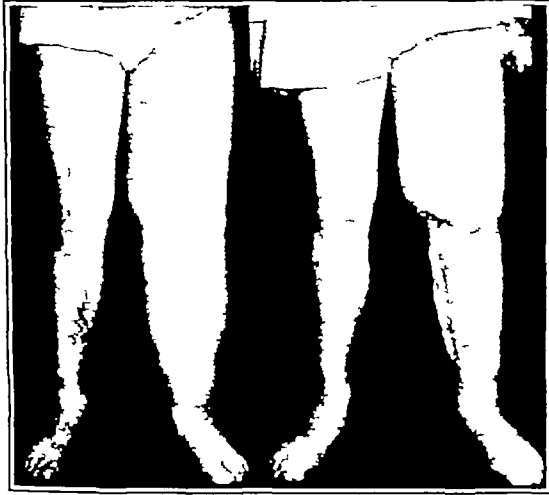


FIGURE 6. A rather unusual type of elephantiasis which followed a femoral adenitis. The thigh is disproportionately enlarged. A so-called Kondoleon operation was performed several years ago without effect. Only one scar (in the thigh) can be seen. On the right, plastics 1 and 2 have been performed. The wearing of an anklet has preserved the shape of the ankle.

at least a part of the nerve supply to the heel, that is, the sural nerve, a matter requiring a rather careful dissection. In other respects, the operation is just the same as the first one. In my experience, however, these posterior flaps cannot be left so broad as the anterior ones, being more likely to suffer from sloughing along their edges (poor venous return?).

Following this second operation, the patient is sent home wearing a bandage and is instructed to keep the leg elevated as much as possible. An interval of two months or so should probably elapse before the final pair of plastics is carried out. The reason for this is obvious enough. One cannot turn up a second thin pair of flaps whose bases are contiguous with the previous plastics until sufficient time has gone by for the local blood supply to adjust itself. As a matter of fact, the last two operations are very much easier than the first two. It is at one of the second pair that the second operation upon the foot, if such is required, must be done.

In all, there have been eleven cases of elephantiasis nostra. Of these, two may represent

the familial disease and have not been treated. Of the rest, eight have been subjected to operation, but, owing to various contingencies, only four have accepted the complete plastic in four steps. The others, being greatly improved, have been satisfied with either two or three operations. Only the most recent cases have received what is held to be the standard treatment.

Apparently, replantations of the skin over the entire lower leg, and dorsum of foot, effect a satisfactory improvement in elephantiasis nostra. Operation on the thigh is not necessarily required. The use of a bandage for the leg after operation is probably necessary.

For elephantiasis due primarily to infection, the use of plastic operations is not clearly indicated.

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#### DISCUSSION

DR TORR WAGNER HARMER. I can make no original contribution to this discussion either from experimental work or operative experience. It is an intriguing field of surgery. The literature is somewhat confusing due to efforts to explain the etiology of the different varieties and to classify them.

As I understand the situation there are two main classes: (1) those which are primarily due to infection and (2) those which are primarily lymphatic obstruction. Practically all cases of both classes have superimposed several attacks simulating erysipelas before the characteristic elephantiasis develops with huge folds and deep creases.

In the infection class a thrombophlebitis or lymphangitis or lymphadenitis may produce more or less lymphatic obstruction. Lymphedema ensues. In this class may also be included the filarial cases. Even in this tropical form Sir Peter Manson has pointed out that several erysipeloid attacks occur before the characteristic elephantiasis appears.

In the other class in which lymphatic obstruction is primary the cause is often unknown. Homans distinguishes a sporadic and a familial type (so-called Milroy's disease). Edgar Allen of the Mayo Clinic uses the term *praecox* to separate a group in which the disease does not become manifest till the 10th to the 24th year from a clearly congenital group. His *praecox* group may really be cases of congenital lymphatic anomalies which carry on satisfactorily up to a certain period of growth of the body when this anomalous arrangement becomes inadequate.

In the lymphatic obstruction class fall the cases of lymphedema following radical breast amputa-

tions whether this be due to thorough lymphatic ablation or to infection or metastases or irradiation. Many of us have a number of such cases and in them we are familiar with these so-called 'attacks', fever, heat, redness and swelling which Homans has described and has had occur in his dogs. One of my cases has had during the 15 years since her operation three such attacks. Incidentally she fell recently and dislocated the shoulder of her huge arm. Reduction was awkward but successful.

These attacks are followed by more fibrosis and thus a vicious circle is established. The retained lymph undergoes chemical changes. The protein content increases. The normal is about 1 per cent in the tissues and 7 to 8 per cent in the blood serum. That of the tissues in cases of elephantiasis runs from 3 to 55 per cent in Homans's dogs about the same. The retained high protein fluids induce fibrosis which, in further encroaching on lymphatic channels and destroying them, leads to more fluid—and so on to '5 gallon legs'.

Homans, Drinker and Field in their beautiful work on experimental elephantiasis recovered hemolytic streptococci at the beginning of the "attacks" in their dogs. The fluid curiously enough was inert when injected into normal legs but caused a typical attack when injected into elephantiasic legs. For such attacks in human beings polyvalent streptococcus antiserum is rational. Alton Ochsner following Matas gives it once or twice a day till the temperature is normal and then once a month in 10 cc doses. He believes that attacks are averted and

that consequently the disease is retarded. I have used this serum with satisfaction for an attack in a case of marked lymphedema of the leg of the sporadic type.

Last year Bertram Bernheim reported a case of a boy aged 3 years, upon whom he did a Kondoleon operation of slight extent preceded by a decompression of the femoral vessels with improvement and apparent arrest of the disease 3 years later. He believes that the decompression freed up lymphatic channels. This view is untenable after Homans's futile search for lymphatics along the femoral vessels.

In some types of lymphedema the lymphatics in the pelvis along the iliac vessels have been explored. In some of these cases lymphatic obstructions have been found, and permitting the abdominal drainage of the lymph has temporarily improved the condition of the leg. In other cases, however, these iliac lymphatics have been found fibrosed and thickened. As Homans has said further exploration of these lymph channels is necessary.

The author has described the principles underlying the Kondoleon operation and Sistrunk's modification of it. He has also noted Auchincloss's new departure. Homans's operation is an Auchincloss procedure to the nth power. It is very radical on the leg but does not disturb the thigh. It seems to promise a more consistently high number of improvements and better cosmetic results. I congratulate Doctor Homans on his valuable contribution to this subject.

## THE REPAIR OF CONTRACTURES RESULTING FROM BURNS

BY V. H. KAZANJIAN, M.D.\*

THE problems presented to the surgeon by a seriously burned patient constitute some of the most serious and vexing ones of all traumata. These arise from the inception of the lesion and continue through the final plastic operations for the correction of deformities. The treatment, therefore, of this type of patient is a complex one. A review of the literature for the last twenty-five years reveals that a great deal of investigative and clinical work has been done to solve these complicated conditions.

The treatment of burns may be divided into three distinct stages. The first is the treatment of shock. This phase occurs immediately or within a few hours after the burn has taken place and must be dealt with adequately and vigorously before any treatment is given to the lesion itself. The second phase broadly includes the period of toxemia and infection. No definite time elements can be given for the second stage, since each patient presents an individual problem depending on the size, location and depth of the burn, and the general condition of the body as a whole. The third and final period of treatment deals with the repair of damaged tissues and the correction of deformity. This latter period of treatment should begin during the second phase. The results are

much more satisfactory when the patient is conducted through his toxemia in a method most conducive to the prevention of deformity.

It is of utmost importance that the second and third stages of treatment are not divided too distinctly. The proper treatment of the toxemia and infection of the burned patient is primarily instigated for the purpose of saving the life of a patient, but it also has a distinct bearing on the sequelae. For example, even in many third degree burns there are many islands of epithelium at the base of the hair follicles and in the sebaceous tissues that are not destroyed at the time of the injury. If the local treatment keeps the burned areas free from infection throughout the period of convalescence, these islands will grow and spread into a soft pliable covering. The incidence of skin grafting and contractures is thus lowered. Again, even in burns which are sufficiently deep to destroy all epithelium local treatment that tends to prevent infection makes for the rapid appearance of healthy granulations. This allows early surgical intervention and a consequent lessening of deformity.

The present paper deals primarily with the problems of repair of deformities resulting from burns. No extensive discussion will be carried on as to the proper methods of handling the infectious stage. At the present time the tannin

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acid treatment advocated in 1925 by Davidson and Aldrich's gentian violet treatment brought out in 1932 seem to be the two most widely accepted. Neither of these treatments answers all the problems presented by the burned patient. The surgeon handling large burns usually has and needs a great many methods for dealing with complications.

At times the burn is not seen in its early stage. Home treatment has usually been instituted and, by the time the surgeon sees it, the burn is infected and resembles an old ulcer with a certain amount of cellulitis surrounding it. This type of burn responds best to a preliminary treatment of a daily wash composed of equal parts of tincture of green soap and hydrogen peroxide. After the area is cleansed with this mixture, a nonirritating mild antiseptic dressing is helpful. Certain burns, even though handled properly from the first, reach an indolent stage when there is little or no proliferation of granulation tissue. When this point is reached any previous treatment should be stopped and one of the cod liver oil ointments applied. Granulations usually begin building up within three or four days after the treatment. Sometimes this indolent phase occurs in the process of epithelialization. An ointment composed of scarlet red oxquinoline sulfate and chloretone is of great value in causing a further spread of the skin.

Undoubtedly the most suitable time to begin reparative work in burns is before the scar tissue begins to form contractures. In this stage the tissues are relaxed. Deep fibrous bands under the granulations have not become evident. It is obvious, however, that this cannot be done unless the area is in a healthy receptive condition. Hence, from the point of view of successful repair it is important to have the burned area itself practically aseptic and the patient in general good health.

In its earliest stage the surgical repair of burns is accomplished almost exclusively by the free transplantation of skin. The pinch graft method originally introduced by Reverdin in 1869 is still used extensively. It has certain advantages over other methods of grafting which make it especially suitable as an early method of repair. First it can be applied successfully to an unepithelialized area not wholly free from infection without submitting the patient to general anesthesia. Secondly, in extensive burns one frequently cannot find donor areas sufficiently large from which to borrow skin to cover the lesion. Sufficient pinch grafts can generally be secured to distribute over a large surface. There are two drawbacks that make pinch-grafts undesirable in some burns. They are not suitable for exposed parts of the body, especially the face as the cosmetic result is poor and each

pinch-graft is usually surrounded by a dense scar which takes a long time to become soft and pliable.

With the exceptions of the conditions mentioned above, the Thiersch graft (called split-graft by Blair and razor-graft by Gillies) is preferred to the pinch-graft for the repair of clean granulating wounds as well as burns. The area to which it is applied is immediately covered with epithelial tissue. In the case of a successful 'take' it gives quick relief to the patient, prevents deforming contractures and shortens the period of hospitalization and convalescence.

### *Requisites of Skin Grafting*

Thiersch grafts can be applied successfully over large areas providing the following fundamental points in technique are respected:

- 1 The raw areas must be practically free from infection. This can be effected by the proper preoperative treatment of compresses of normal sterile saline alternating with compresses of Dakin's solution for a period of twenty-four hours before the graft is done.

- 2 The surface area must be one composed entirely of healthy granulations.

- 3 Exuberant granulations should be removed with a sharp razor with as little trauma to the underlying tissues as possible.

- 4 Complete hemostasis must be secured immediately after the removal of the granulations. Usually compression of the wound with warm sterile saline packs for a few minutes is sufficient to stop capillary bleeding. In rare instances the application of gauze saturated with adrenalin chloride is advisable since one must avoid tying vessels with catgut or silk as much as possible.

- 5 The location from which the graft is taken is prepared with any of the accepted antiseptic techniques. It is sometimes of aid to paint the donor area with a thin film of flexible collodion. While the present method in cutting skin is far from ideal the use of Blair's suction retractor and a very sharp razor knife is better than any other method known to the writer. The graft should be large enough completely to cover in one piece if possible the recipient area.

- 6 The graft should be spread over the raw area evenly and held in position with fine silk sutures. It is not necessary to approximate the borders accurately. In fact, it is even desirable to overlap the periphery of the wound in order to make sure that the entire raw area is covered. The excess skin may be excised later.

- 7 The graft should be covered with a non-adhering, non-irritating dressing such as crepe de lys, perforated paraffin mesh or Cargile membrane. For dressings Dr. J. Davis has advo-

eated a sterile sea sponge. A wet surgical-gauze dressing, however, is just as effective.

8. The grafted area should be immobilized with a pressure bandage. Any one of the patented weave cotton bandages will do. The greater control there is of fixation the better the chance for success.

### *After-Care*

The dressing should be left in position for about four days. If there is any evidence of infection, manifested by pain, tenderness, high pulse, or fever, the wound should be inspected sooner. Some surgeons do not disturb it for even a longer period than four days, but in my experience with grafts covering large areas, I find it more advisable to inspect the wound at the end of this period. If one finds isolated areas of necrosis or blebs, they should be carefully excised and the wound dressed daily.

### *Full Thickness Grafts*

This type of graft offers an exceedingly valuable method to use in a limited area. This is especially true of the hands, neck, axillary fold and occasionally over the face. It may be removed from its bed in a uniform thickness with a sharp knife. The abdominal wall is an ideal donor site if a sufficiently large piece is required. The skin should be carefully sutured over the wound. In this type of graft it is highly desirable to cut the skin according to the pattern of the wound and to approximate the borders as accurately as possible. The disadvantage of the Wolfe graft when applied to the face is that its color is at times objectionable and the chances for a successful "take" are less than that of the Thiersch graft.

### *Limitations of Skin Grafting*

While the various forms of skin grafting are exceedingly valuable for the repair of deformities from burns, yet one is always aware of their limitations.

1. A free graft does not keep its original size. Its rate of contraction differs in various locations. Skin grafts of a moderately hard base, such as the forehead, the nose, the hands and fingers, and the chest, contract less than when they are transplanted over loose tissues.

2. Skin grafts do not contain enough subcutaneous tissue, and lacking fat they often do not afford enough bulk to give sufficient contour. This is especially important when the face and exposed parts of the body are involved and also in places where it is essential to pad the defect with fat as well as skin.

We may evaluate the true picture of various methods of repair of skin defects by taking as an example an unsightly scar covering a small area. We excise the scar, and approximate the borders, suturing them as carefully as possible,

provided this can be done without causing undue tension on the surrounding tissues. The skin around the wound is usually undermined, in order to relieve such tension. Many minor defects can be repaired by this method owing to the elasticity of the skin. However, if this causes distortion to the surrounding parts, especially to the face, lips, and eyelids, or if the defect is too large to approximate the borders successfully, our next recourse is to borrow skin tissue from the immediate neighborhood of the wound in the form of a sliding or transposed flap. We can frequently repair many extensive deformities by utilizing tissues that surround the lesion. This is the so-called pedicled graft. The Indian, as well as the French method of rhinoplasty is based upon this principle. In the repair of larger defects, particularly of the lips, it is unquestionably logical. In extensive contractures one may advantageously use pedicled grafts, supplemented with skin grafting, if necessary.

### *Pedicled Grafts*

By a pedicled graft or flap we mean a mass of tissue, containing usually the skin and subcutaneous fat which is raised from its bed but is left attached to the surrounding skin at a selected position of its periphery. Esser describes similar flaps in which the skin is entirely cut, but a portion of the subcutaneous tissue is left attached. These he calls "island flaps." Pedicled flaps may be obtained from nearby tissue or from a distant part. They may be single or multiple. There are three methods of obtaining pedicled flaps.

1. The French method of sliding flaps from nearby tissue, allowing little or no torsion of the pedicle.

2. The Indian method in which the flap is again obtained from nearby the defect and is shifted to its new position by a twist of the pedicle. The pedicle of the flap in this method may be next to the deformity or it may bridge over normal tissue to allow the flap to be placed in its new position.

3. The Italian or tagliacotian method in which the flap is borrowed from distant areas, usually from the arms.

### *Tube or Rope Grafts*

There are conditions where the deformity covers a greater area of the face than can be corrected by the use of sliding flaps. In these cases we are obliged to seek a more distant source of supply for the necessary skin and subcutaneous tissue. For this purpose a tube or rope flap (Gillies) can be prepared from the covered parts of the body, such as the upper arm, thorax, abdominal wall or the back, and through a series of operations can be transplanted to cover the defects of the face. The advantages of this



method are the prevention of additional scarring of the face and the securing of an almost unlimited amount of tissue. There are, however, some disadvantages which should be considered in borderline cases. The skin of the protected parts of the body does not harmonize with the normal tissue of the face owing to a difference of texture, although in time nature may tend to lessen this difference. This procedure also requires a longer period of hospitalization and many more operations are necessary than when tissues from the immediate vicinity can be utilized.

#### *Treatment of Specific Areas*

The treatment of deformity resulting from burns varies according to the extent and location of the lesion. Any portion of the body may be involved, but the parts most frequently affected are the face and neck, arms and hands, and less frequently the lower extremities. Deformity of the face may involve the greater part of that portion of the body, causing cicatricial contraction of the nose, eyelids, mouth, ear, eyebrows and chin. A brief outline of the treatment of various isolated deformities about the face will be considered.

**Eyelids** Severe burns of the eyelids, or of that portion of the face near the eyelids, often lead to marked ectropion. These conditions cause extensive exposure of the eyeball and may affect the sight. The lower lid is usually involved more frequently than the upper. Skin grafting is quite useful in repairing contractures of the upper eyelid, but it is not nearly so successful for the repair of extensive ectropion of the lower lid. For this reason it has been the author's habit to repair the lower eyelid with a transposed flap of skin from the temporal region or even from the forehead. This method, as will be seen from the illustrated cases, seems to be quite positive and efficient. The transplanted tissue has a great deal of bulk, contracts very little, and where the action of the orbicularis oculi muscle is lost, this type of repair helps to support the lid in a comparatively safe position. The same advantages cannot be claimed for a full thickness graft on the lower lid. The temporal flap is especially suitable for eyelid repair because of its proximity. For blood supply one of the branches of the temporal artery may be included in the flap tissue and thus larger flaps may be cut in proportion to the base than from localities where the course of the blood vessels is not so favorable.

Usually the resulting defect when a flap is taken from the temporal or frontal regions may be closed by approximating the borders of the wound. This is especially true in older patients where there is a great deal of relaxation of the skin. If the defect cannot be closed by approx-

imation the secondary wound should be repaired with a Thiersch graft.

If the repair of the face involves large areas for which it is advisable to transpose a bigger delayed flap from a distant part of the body, the repair of the eyelids is done with this tissue at the same time.

**Cheeks, Nose and Mouth** Isolated dense scars of the cheek, nose or mouth regions are best repaired by free skin grafts. In the repair of a small defect a moderately large piece of skin may be taken from the back of the ear without causing any distortion of the contour of that organ. Skin from behind the ear is especially suitable for repairs of the face because it also is an exposed part of the body and blends more favorably with the texture of the face than skin taken from a covered part of the body. When the greater part of the face is involved it may be advisable to use a larger delayed flap from a distant portion rather than depend upon multiple skin grafts which may not have such good cosmetic results.

**Neck** In treating contractures of the neck, several fundamental things must be considered before one can determine the best procedure to follow. The extent of the deformity, the amount of tissue lost, the nature of the scar—whether it is soft or indurated, superficial or deep, the amount of contracture, and finally the existence of normal tissue in the surrounding parts—all of these factors influence the technic and type of repair to be used.

In slight contractures there is usually a vertical scar line forming a web that pulls the chin downward or sideways. The rest of the neck tissue is usually normal. In such cases the well-known "Z" incision is the best method of repair. This allows the use of the skin in the immediate neighborhood of the defect in a simple and satisfactory manner.

In cases where there is dense scar tissue involving a large portion of the neck area the "Z" incision cannot be employed. This type of contracture is best treated with a full thickness or short graft taken from the abdominal wall. Frequently the vertical suture lines at the junction of normal and transplanted skin have a tendency to form web like contractures which may have to be repaired later by the "Z" incision.

Certain types of neck contractures are best handled by the use of a sliding flap from the lower part of the neck, the remaining raw area being covered with a free skin graft. This method in selected cases gives a better cosmetic effect and permits greater freedom in the movements of the neck.

For large burns involving the entire front of the neck and upper part of the chest where the chin is almost adherent to the upper edge

of the sternum, one is obliged to take tissue from a distant part of the body. For this purpose, delayed pedicled flaps are most efficient.

### *Contractures of the Axillary Region*

Contractures of the axillary region resulting from burns may be so slight as to cause no limitation of motion, merely exerting a tension on the skin of the upper arm and chest when the arm is fully extended over the head. From this mild degree of pathology the contracture may vary up to a complete web binding the arm to the chest wall. The slight contractures are quite common in the axillary region. Here again the "Z" incision gives the most satisfactory results. Frequently a long band is repaired by a series of "Zs." If the injury has been too extensive and this method does not allow the arm sufficient free motion, sliding flaps supplemented by skin grafts for the resulting raw areas should be used. It is advisable, however, to extend the lateral flaps from the "Z" incision under the axillary fold and place the skin graft below at the lateral aspect of the chest.

In extensive contractures it is not unusual to find a large part of the upper arm adherent to the chest wall. The web thus formed is frequently composed of dense scar tissue. If the burn was severe enough to destroy the skin of the axillary fold, it probably also injured the skin of the chest which is more exposed. This condition naturally complicates the plan of the repairing operation. It is often necessary to prescribe frequent massage and heat treatments in order to increase the vascularity of the entire area and to soften the deeper scars. In contractures of this type we rely on delayed pedicled grafts as the main source of donor skin supplemented by skin graft. The pedicled graft may be prepared from the back or scapula region, lateral or anterior part of the abdominal wall, and gradually transferred to the axillary region. Gillies's method of using the wrist of the opposite arm to act as a carrier for the rope flap is advised if circumstances warrant the use of tissue from the opposite side of the body.

### *Contractures of the Hands and Fingers*

Contractures of the hands and fingers resulting from burns on those regions result in the most serious disabilities. These disabilities usually form a grave economic problem for most patients. The joints of the fingers often become partially dislocated or ankylosed. Scar tissue lessens the vascularity of the fingers and complicates repair.

In the majority of such cases the full thickness graft operation is the procedure of choice. This applies especially to the palmar and dorsal surfaces of the hand. In doing a pedicled graft the hand may be successfully attached to the abdominal wall and enough skin for the repair

borrowed from that area. If this method is elected, it is not necessary to make a tube flap since this prolongs the process unnecessarily. After excising freely the scars about the hand and cutting through the deep adhesions, the raw area may be covered directly by a pedicled graft from the abdominal wall. After a reasonable time the pedicle should be separated.

In patients with old burns we frequently find no definite contracture, but a pathological change in the texture of the skin. It becomes thick and tense and seems to remain in that condition indefinitely. In the arms and legs, especially of children, this thickness of the skin leads to an atrophic condition of the extremity involved. A certain number of these dense scars undergo degenerative change and become malignant. It is advisable, therefore, to operate and release the tension of the skin in selected cases. The operation consists of excising the keloid scar sufficiently to allow complete relaxation of the tissues. The resulting raw areas are repaired by free skin grafts. Not infrequently when the tension of the particular area is released, increased blood supply will cause the surrounding skin to become soft and more elastic.

This brief description of the repair of contractures of various parts of the body following burns is not intended to be dogmatic. Each individual patient presents specific and variable problems. It is impossible to classify them empirically. Each case should be studied carefully from the viewpoint of determining the exact condition of the scar and surrounding tissues, and the method chosen for repair must be simple and must be the answer to the existing problem. It should be one that requires the least hospitalization and should offer the least risk of failure. This last is very important, as a failure creates complications which lead to longer disability, or in some cases prevents complete success.

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CASE 1 FIG 1



CASE 1 FIG 2

CASE 1 This patient suffered severe burns about the face and head when a celluloid eye shield caught fire while she was studying. The burn involved the entire upper part of the face including the nose, eyelids forehead and part of the scalp (fig 1). From the beginning she was treated with gentian violet. As soon as the wounds were clean free transplantation of skin was done over the forehead temporal region and nose as these areas were markedly involved by third degree burns. In this

respect it was interesting to see that after a little while the areas that received early transplantation of skin were smooth and free from keloid scars while the lower part of the face where burns were more superficial epithelialized itself very quickly yet developed thick keloid scars (fig 2).

This patient was seen again in 1936. The keloid scars had become softened and smooth. The texture and the color of the skin were naturally different from the normal skin (fig 3).

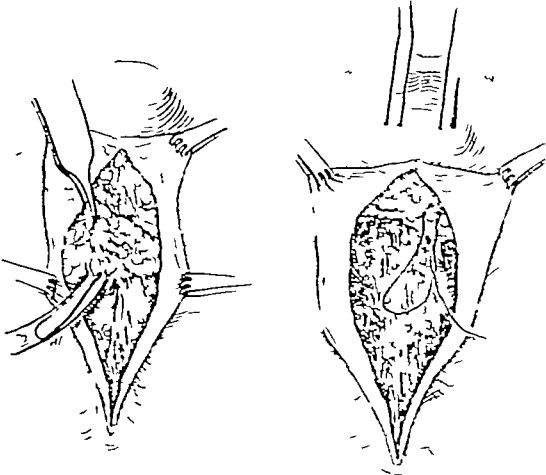


CASE 1 FIG 3

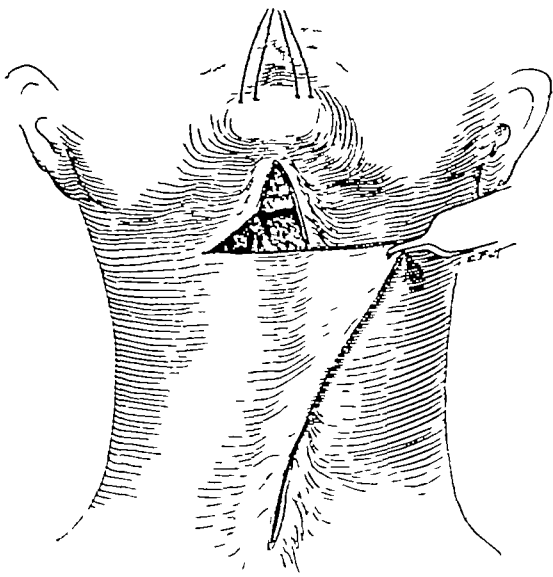
CASE 2 This patient aged 22 years had a birth mark of the neck which had been operated upon in childhood and the birthmark removed. She was later operated upon again for the removal of the scar. As she grew older there developed a web like scar extending from the median line of the chin to the base of the lower part of the neck (figure 1). This scar line had a considerable effect upon the contour of the chin. She was operated upon under ether anesthesia and the scar was excised. The skin on either side was undermined quite extensively and part of the fatty tissue was dissected from under the chin and brought forward to assume a position in front of the symphysis (fig 2). This was done to give a little more prominence to the chin. The familiar Z incision was made above and below, through the skin on each side, creating two triangular flaps (fig 3). Their positions were interchanged (as seen in the diagram) and then sutured into position (fig 4). This procedure gave free motion in flexion and extension without injuring the skin (fig 5).



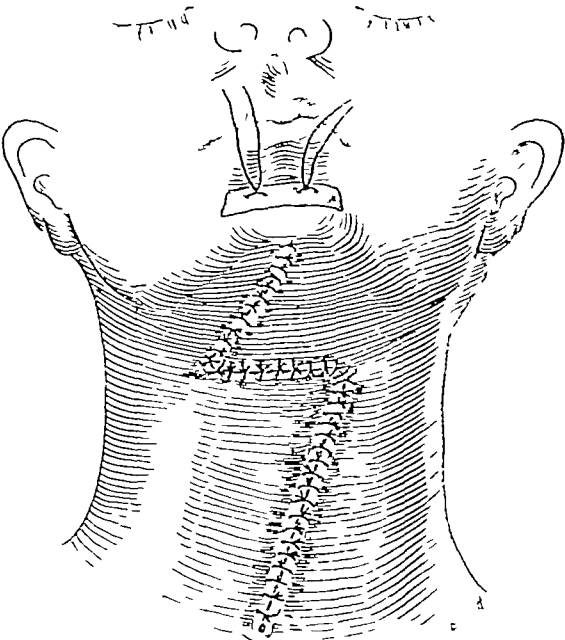
CASE 2 FIG 1



CASE 2 FIG 2



CASE 2 FIG 3



CASE 2 FIG 4



CASE 2 FIG 5



CASE 1 FIG 3

CASE 2 This patient aged 22 years had a birth mark of the neck which had been operated upon in childhood and the birthmark removed. She was later operated upon again for the removal of the scar. As she grew older there developed a web like scar extending from the median line of the chin to the base of the lower part of the neck (figure 1). This scar line had a considerable effect upon the contour of the chin. She was operated upon under ether anesthesia and the scar was excised. The skin on either side was undermined quite extensively and part of the fatty tissue was dissected from under the chin and brought forward to assume a position in front of the symphysis (fig 2). This was done to give a little more prominence to the chin. The familiar Z incision was made above and below through the skin on each side creating two triangular flaps (fig 3). Their positions were interchanged (as seen in the diagram) and then sutured into position (fig 4). This procedure gave free motion in flexion and extension without injuring the skin (fig 5).



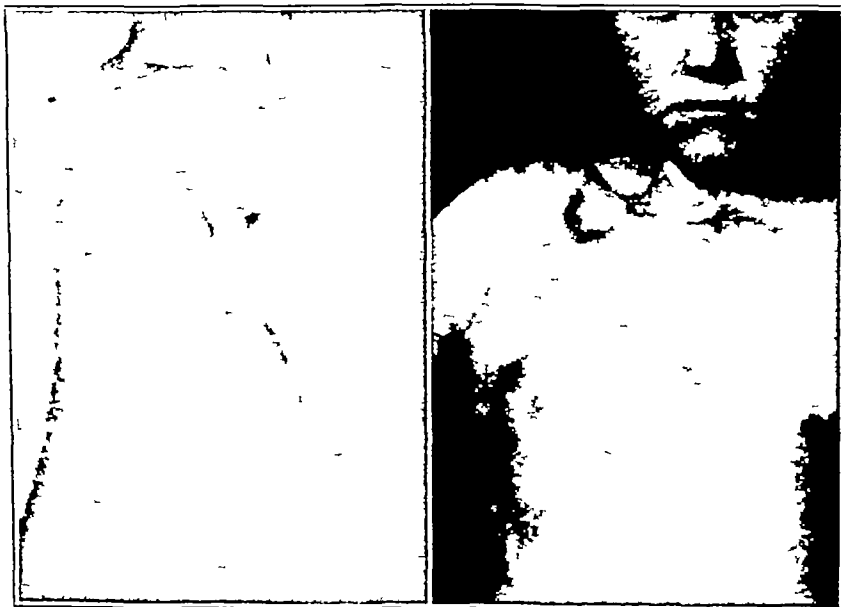
CASE 2 FIG 1

CASE 4 This patient, aged 7 years, was burned while playing with matches on July 4, 1927. When I first saw her, a year later, there was marked contraction of the neck, and dense scar tissue had spread over the chest and axillary region (fig 1).

The upper arm was adherent to the chest wall to a considerable extent. She was operated upon and the scar of the neck was excised. The deep adhesions were cut through until the neck was free from limitation of motion. The raw area was covered



CASE 4 FIG 1



CASE 4 FIG 2



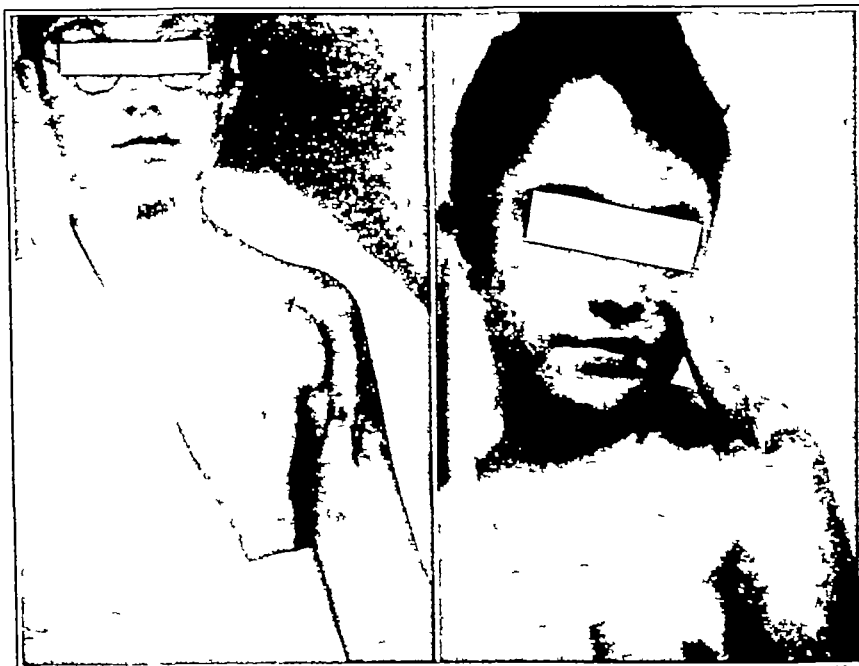
CASE 3 FIG 1

CASE 3 This patient, aged 6 years was first seen 4 years after she had been severely burned. Examination showed marked contraction of the right side of the neck caused by a deep indurated scar (fig 1). This contraction was causing considerable distortion of the face and corner of the mouth. She was operated upon the scar of the neck excised and all the deep fibrous bands separated. This resulted in a raw area approximately 3 by 4 inches in diameter. A full thickness skin graft was removed from the abdominal wall and transplanted to the neck to cover this defect. The borders of the transplant were carefully sutured to the surface of the wound with fine silk. The surface of the transplant was covered with corgile membrane and padded with moist gauze, and a pressure bandage was applied. The patient made an uneventful recovery and used an Ace bandage in the form of a collar for 2 months following the operation (fig 2).



CASE 3 FIG 2





CASE 5 FIG 2

jury but my examination showed considerable distortion of the left lower eyelid and the corner of the mouth (fig 1). The skin grafts about the face were quite conspicuous both in appearance as well as in contour. In undertaking this case I felt that it would be advisable to use a delayed pedicled

for the first time Nov 1 1932. Examination showed thick keloid scars covering almost the entire front of the chest down to the umbilicus and on the right side extending toward the axillary border causing considerable contracture (fig 1). The skin of the



CASE 5 FIG 3

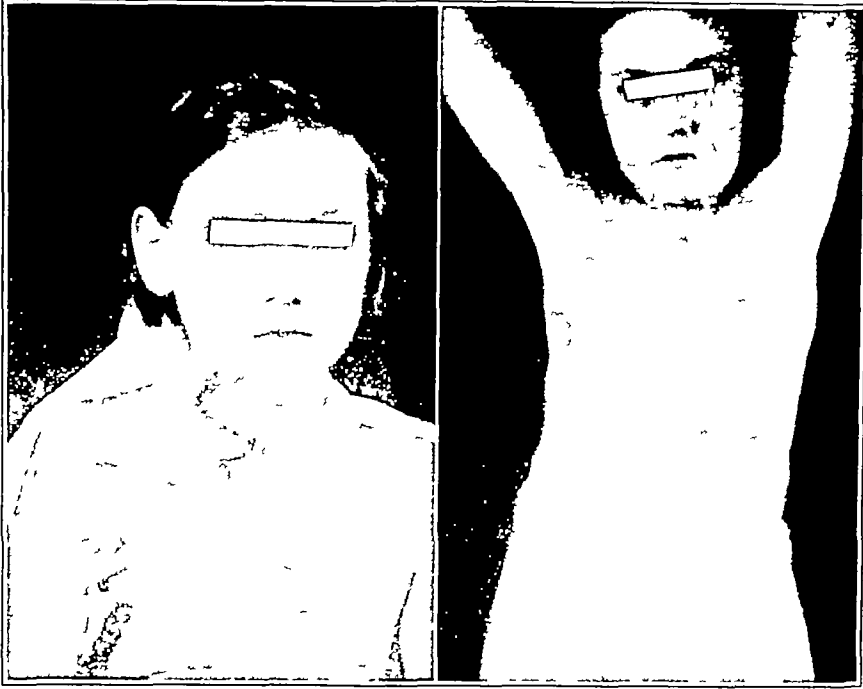
graft from the inner surface of the upper arm. This was done in five stages. The graft was spread over the face which gave a satisfactory contour to the face as well as the corner of the mouth and eyelid (fig 2). The patient now 17 years old has been seen recently. The color of the transplanted skin is blending quite well except for the hair bearing areas (fig 3).

CASE 6 This patient aged 5 years was accidentally thrown into a bonfire July 15 1932. I saw him



CASE 6 FIG 1

neck was badly burned and the chin retracted toward the sternum. There were also some hard keloid scars scattered over the right shoulder. It was decided in this case to use a tube flap to repair the neck and in the meantime massage and heat were to be applied to soften the scars. A rope graft was prepared on the right scapular region and gradually transferred to the neck in four stages (fig 2).



CASE 4 FIG 3

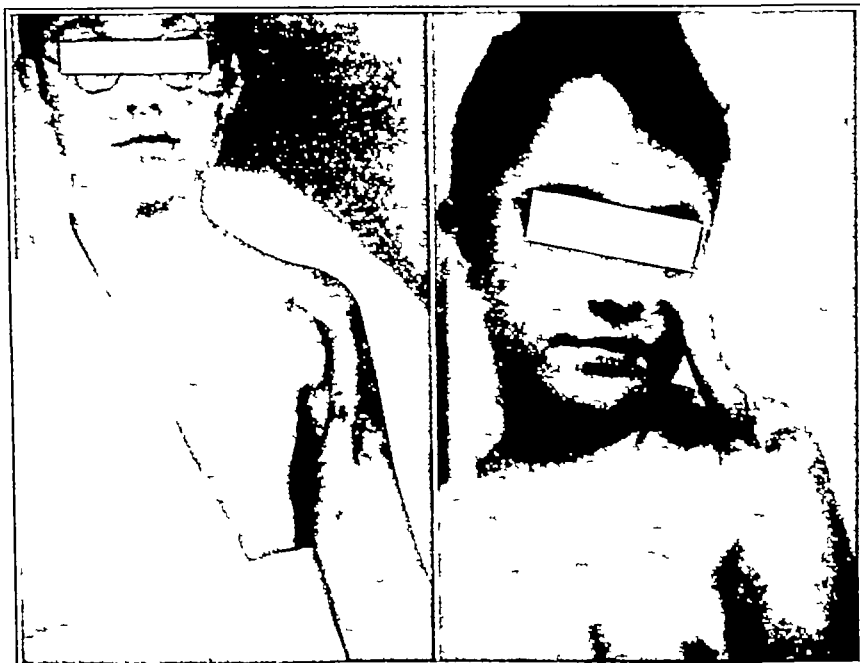
with a full thickness graft taken from the abdominal wall. She made an uneventful recovery following this operation. Later the suture lines formed slight keloid scars and it was necessary to excise them in another operation by making a modified

Z' incision. The axillary repair was accomplished by making a long tube flap below the scapula region, extending downward to the abdominal wall (fig 2). This tube flap was eventually spread in front of the chest and axillary region (fig 3).



CASE 5 FIG 1

CASE 5 This patient was injured in an automobile accident when he was 7 years old. Evidently he suffered only injuries to the soft tissues of the face with considerable loss of skin tissue as there was no evidence of bony injury when I saw him 4 years later. He had had skin grafting following the in



CASE 5 FIG 2

jury, but my examination showed considerable distortion of the left lower eyelid and the corner of the mouth (fig 1). The skin grafts about the face were quite conspicuous both in appearance as well as in contour. In undertaking this case I felt that it would be advisable to use a delayed pedicled

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CASE 5 FIG 3

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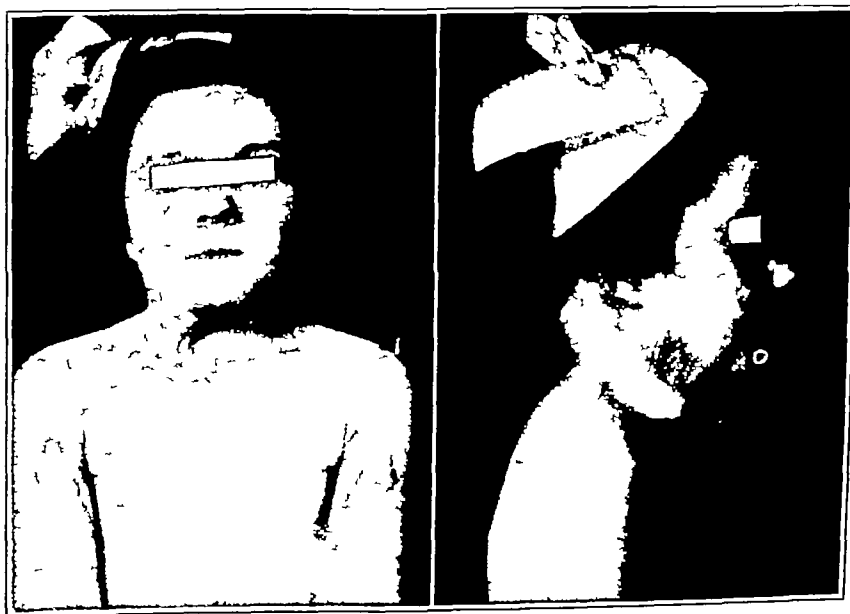
CASE 6 FIG. 2



CASE 6 FIG. 3

It was surprising to see that as soon as the adhesions of the neck were released the patient began to have greater freedom of the movements of the arm (fig 3)

CASE 7 This patient aged 5½ years, was burned when her clothing caught fire from a gas stove. She received treatment at a local hospital. When I first saw her 18 months later, she had scars over the arms and chest which were more or less hard and elevated but there were no contractures. The neck was pulling to the right and was partly adherent to the chest by a thick scar band (fig 1). She was operated upon under ether anesthesia and the scars freely excised until the neck assumed a free position. The resulting raw area, approximately 2 by 4 inches in diameter, was closed by sliding a flap of skin from the side of the neck. The patient made an uneventful recovery. She used a pressure bandage in the form of a collar for a number of months (fig 2).



CASE 7 FIG. 1



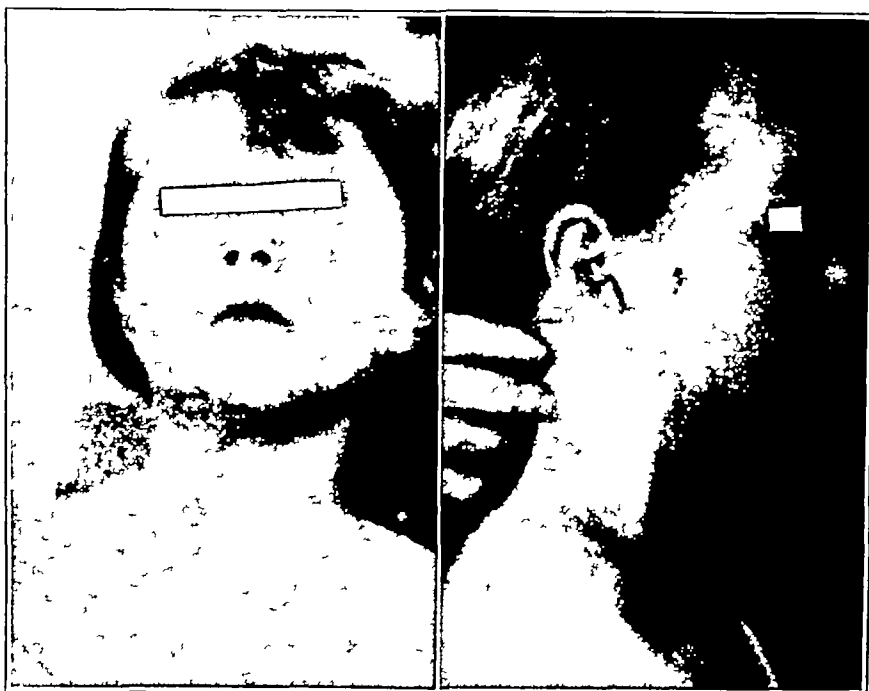
CASE 7 FIG 2

CASE 8 This patient aged 6 years was scalded with hot water which resulted in contraction of the right side of the neck (fig 1). She was operated upon under ether anesthesia and all the scars and deep adhesions were removed. This resulted in a raw area approximately 3 by 5 inches in diameter. The borders of the skin about the wound were under

mined freely which helped to reduce the size considerably. A full thickness graft was then removed from the inner surface of the right upper arm and sutured over the neck. There was no difficulty in approximating the borders of the arm wound. A pressure bandage was applied to both the neck and the arm. The patient made an uneventful recovery (fig 2).



CASE 8 FIG 1



CASE 8 FIG 2

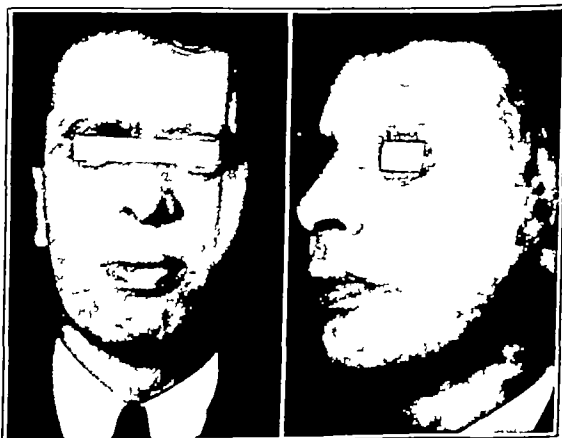
**CASE 9** This patient, aged 29 years received injury of the left eye from sulfuric acid burns. Examination about 6 weeks later showed a practically complete, quite dense leukoma of the left cornea, through which only the peripheral iris could be seen (fig 1). The patient also had retraction of



CASE 9 FIG 1

the left upper and lower eyelids. Repair was done in the following manner. An incision was made just below the supra-orbital ridge over the skin of the upper eyelid, and the skin was undermined for a short distance. Then an incision was made just below the tarsus of the lower lid and the skin

was undermined for a very short distance. A small skin graft (ovalshaped) was taken from the posterior aspect of the right ear. This was cut into two parts and a part was placed on each eyelid, upper and lower. The grafts were sutured with fine silk. Postaural incision was closed with dermal sutures. Boric ointment was put over the eye and cargille membrane placed over it. A pressure bandage was applied to both the eye and the ear. The dressing was left intact for 4 days and afterward it was changed daily. The patient made an uneventful recovery. On the advice of an ophthalmologist a thin eye shell was inserted over the eyeball and this helped the cosmetic effect materially (fig 2).



CASE 9 FIG 2

CASE 10 This patient, aged 4 years was burned while playing with some matches in her crib. The burned area involved the entire left side of the chest wall extending well over the midline in front, the

abdominal wall, both arms, right side of face, right side of neck, and the right ear. The burns were entirely third degree. She was under the care of Dr. Aldrich who treated the burns with gentian



CASE 10 FIG 1



CASE 10 FIG 2

violet. He used pinch grafts from the left thigh to the abdominal wall as soon as that area was clean and in a receptive state for grafting. When healing was finally complete she developed considerable contraction of the right axillary region due to a web formation. There was a band in the right antecubital fossa which flexed the forearm and upper arm. Another band on the flexor surface of the wrist caused considerable distortion of the thumb and hand (fig 1).

The patient was operated on twice. The first operation consisted of repairing the axillary region by the use of a series of Z incisions. In the next operation a Thiersch graft was applied to the wrist and elbow. Figure 1 shows the child before the first operation. Figure 2 shows the child after the second operation. A third operation will be done on the right thigh and groin for the removal of dense scar (fig 2).

CASE 11 This patient aged 29 developed an acute ulcerative infection of the neck and chest in April 1927 which terminated in an indolent lesion. She was first seen by me July 24 1927 (3½ months later). Examination showed a raw granular and suppurating surface involving the entire right side of the neck from the symphysis along the border of the lower jaw to the back of the ear down to the greater part of the neck and shoulder and reaching as far as the upper border of the chest. This ulcerated surface extended to the left side and to the center of the shoulder with a raw area about 10 by 10 cm in diameter (fig 1). There were a number of small suppurative pockets along the lower part of the chest. The tissues bordering the wound were rather dark red in color and seemed to be lacking in vitality. Previous to my seeing her the patient had been instructed to apply Dakin's solution to the



CASE 11 FIG 1

wound to clean the ulceration and to control the suppuration. I found the wound fairly clean but it was not free from suppurating pockets at different places especially around the borders. While this condition was not due to a burn, there was enough destruction of the skin and subcutaneous tissue to simulate a third degree burn. It was evident that

if the wounds were allowed to heal without surgical interference, a great deformity of the neck and chest would take place. Therefore it was decided to prepare a rectangular flap to be used to cover the raw area of the neck, and to do a free transplantation of skin over the chest wound. This operation was done in three stages (fig 2).



CASE 11 FIG 2

## RETROPHARYNGEAL ABSCESS\*

BY LYMAN RICHARDS, M. D.†

IN any surgical condition in which the preponderant number of cases progress to an uneventful and successful outcome, it is easy to lose sight of the less frequent but ever present instances of complications or even fatalities. Thus, when, on perusal of records of cases of retropharyngeal abscess in children, one encounters again and again the brief and reassuring operative note that the abscess was "opened and drained in the routine manner", one is apt to conclude that there at least is a condition unassociated with any appreciable risk and unlikely to cause the surgeon any particular anxiety. Nevertheless, a survey of a group of reports of retropharyngeal abscess at once brings to light the fact that the mortality rate is far greater than one would at first anticipate and that the condition, regarded by those experienced in it with serious surgical respect, is fraught with a danger of possible complications still not adequately appreciated by the general practitioner or pediatrician. Thus in 1921 Frank<sup>1</sup> reported a mortality of 67 per cent in a series of seventy-four cases, Babbitt<sup>2</sup> in 1924 of 10 per cent in fifty cases, Guthrie<sup>3</sup> in 1926 of 15 per cent in twenty cases, and Greenwald and Messeloff<sup>4</sup> in 1929 of 73 per cent in fifty-five cases. This

astonishingly high average is somewhat reduced by the figures of Bokay, whose large series of 317 cases showed only a fatality percentage of 44. The most encouraging statistics are those of Wishart,<sup>5</sup> who lost only one case in a group of forty one, and this a preoperative fatality in a moribund patient.

This generally high mortality average has prompted me, first of all, to examine a series of 162 cases of retropharyngeal abscess seen at The Children's Hospital in Boston during the past ten years and, secondly, to inquire into the causes and factors that tend to render the condition still one to be regarded with no little apprehension from the operative standpoint. As a result of this summary, I have arrived at certain facts and conclusions which it is hoped will be helpful to those who from time to time are confronted with the problem of dealing with this often critical and potentially dangerous situation. This paper does not deal with the anatomic aspects of the condition. These have been repeatedly and adequately covered by numerous authors. The fundamental existence of retropharyngeal glands which drain the nasopharynx and which, once infected, may break down and suppurate, is a well established fact. I am concerned primarily with pointing out certain errors and pitfalls in the diagnosis of the presence of retropharyngeal abscess and in its surgical treatment, which contribute to a

\*Read before the Section on Laryngology, Otolaryngology and Rhinology at the Eighty-Seventh Annual Session of the American Medical Association, Kansas City, Mo., May 13, 1936.

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mortality rate, as is apparent from the figures submitted, far higher than is commonly supposed. My own fatalities in 162 cases were twelve, or 7.4 per cent.

Male children are more frequently affected than female, in this series in a ratio of 2 to 1, the exact ratio reported by Guthrie. This differs from the finding of Greenwald and Messeloff,<sup>4</sup> whose cases were equally divided in this respect. My oldest patient was 12 years of age, the youngest 4 months, the average age being 14 months. By far the greatest number of patients fell within the age group of from 6 months to 3 years. Similar figures have been reported by numerous authors. In Brooks's<sup>5</sup> series, 75 per cent were under 3 years of age, while, in the group reported by Greenwald and Messeloff,<sup>4</sup> 85 per cent of the cases occurred within the first two years. Sixty per cent of Babbitt's<sup>6</sup> fifty cases occurred in the first year of infancy, while in Frank's<sup>1</sup> series of patients 90 per cent were under 3 years of age. Obviously, the condition is essentially one of infancy and, as will be pointed out later, the condition in the older children differs quite markedly in its clinical manifestations from that in the infants.

Anatomically, the retropharyngeal glands are paired and bilateral. Infection tends, fortunately enough, to be uniformly unilateral and in my series occurred on the right side in eighty instances, on the left in fifty-four, and in the remainder it was not specified. McMurray<sup>7</sup> states that he has never seen, nor found in the literature, a report of a bilateral abscess.

It is quite natural to assume, as stressed by Brooks,<sup>6</sup> that such infections would occur more commonly in debilitated and undernourished children. On the contrary, I found the patient's general condition recorded as good in fifty-one instances and as poor in only twenty-one. Many of the children came from the best of healthful surroundings, where nutritional care had been all that could be desired.

#### ETIOLOGY

Some form of nasopharyngeal infection is commonly assumed to be the precursor of retropharyngeal abscess. Glands draining the nasopharynx would quite naturally, at times, become secondarily infected in the presence of sinusitis, adenoiditis, tonsillitis and otitis media. These conditions may be primary or the result of some systemic infection such as measles or scarlet fever. Almost invariably retropharyngeal abscess is preceded by a varying period of illness not directly attributable to the abscess itself. In table 1 are listed the principal previous illnesses which antedated the development of the abscess.

Eight per cent of Guthrie's<sup>2</sup> twenty cases occurred in May, June and July, tending to re-

fute the idea that this is necessarily a winter disease. However, from this list it is quite apparent that some one of the more common manifestations of infection of the upper respiratory tract is by far the most frequent precursor of retropharyngeal abscess and that the latter is a potential complication particularly in infants. It will be noted that by far the outstanding condition preliminary to the abscess formation was some form of cervical adenitis, either drained or undrained. Next in frequency was the common cold, then sore throats or tonsillitis and then otitis media. The direct relationship of any of these infections to the retropharyngeal abscess is an important question and much has been written about the lymphatic drainage in this connection. Almost any form of pharyngeal or throat infection can light up infection in the retropharyngeal glands, which serve as points of drainage under these conditions.

TABLE 1

#### PREVIOUS ILLNESS

Sore throat	22
Otitis media	21
Cervical adenitis	46
(previously incised S)	
Head colds	26
Tuberculosis	2
Unexplained fever	16
Measles	3
Nephritis	1

Waugh<sup>3</sup> states that retropharyngeal abscess never occurs in children who have been previously tonsillectomized, and he feels that tonsils, diseased in 80 per cent of patients with retropharyngeal abscess, are a potent cause of the infection. In my series twenty-seven patients had undergone previous removal of tonsils and adenoids. It is possible that the same lack of protection against subsequent abscess formation would have been shown by more cases but for the fact that in this age group the operation is naturally less frequent than in the older children.

#### DIAGNOSIS

Of paramount importance in any pathologic condition is a correct diagnosis. Only on this basis can effective treatment be carried out, and, what is more important in a surgical lesion, inappropriate treatment avoided. In retropharyngeal abscess diagnosis depends to some extent on a consideration of the preliminary illness but to a far greater degree on a correct interpretation of the chief complaints. That these are by no means constant and that they are complaints frequently characteristic of a number of other utterly different conditions at once introduce one of the major pitfalls encountered, namely, an erroneous diagnosis.

The major chief complaints on admission listed in the present series are shown in table 2

TABLE 2  
CHIEF COMPLAINTS

Complaint	Cases
Dyspnea (noisy breathing, snoring, cyanosis)	61
Dysphagia (regurgitation, anorexia, refusal)	59
Swollen glands	37
Stiff neck	31
Sore throat	9
Fever	27
Cough	3
Convulsions	2

By far the most common was some degree of dyspnea or dysphagia. Of the former there were sixty-one instances and of the latter fifty-nine, but the two were often combined in the same patient. The dyspnea was not necessarily always urgent in its nature but included in it a variety of lesser respiratory difficulties such as noisy breathing, snoring and evidence of some degree of nasal obstruction. True cyanosis was rarely present. Likewise the dysphagia was not always a gross difficulty in swallowing, such as one sees in true esophageal obstruction. It included regurgitation of food, a marked degree of anorexia, a tendency for the patient to refuse food although apparently hungry, and difficulty in nursing. Next in frequency (thirty-seven) was the complaint of swollen glands in the neck. This, of course, is in proportion to the preliminary history of enlarged glands before the development of the retropharyngeal abscess. Stiff neck was complained of in thirty-one instances, at times erroneously interpreted as an orthopedic condition (torticollis or cervical spine disease), less frequently as a possible meningitis. Generalized fever was a complaint in twenty-seven instances and of course was frequently combined to be present with other conditions. There were two instances of convulsions and, interestingly enough, only three instances in which cough was a chief complaint. In addition, there were rare complaints of bleeding, vomiting and voice changes. From this, one gains a very good picture of the effect produced by the classic retropharyngeal abscess, depending to a great extent on its location. When high enough up to avoid pressure against the laryngeal orifice, the complaints ranged more in the nature of difficulty in swallowing. The lower the obstruction, the more likely was the pressure on the larynx to cause dyspnea of varying severity. It was this symptom more than any other that gave an alarming aspect to the cases entering the hospital as emergencies. The instances of cervical adenitis were probably independent of the actual abscess but occurred concomitantly. Stiffness and tenderness of the neck were of course frequently due to the same cervical aden-

itis rather than to the retropharyngeal abscess itself. The two were often present together. While tuberculous disease of the cervical spine and attendant involvement of the retropharyngeal glands is frequently cited as a causative factor, it was relatively rare in this series. There were only four instances in which the actual abscess itself was found to contain typically tuberculous material and likewise only four in which definite generalized pulmonary or other systemic tuberculosis was recognized. The recovery of typical caseous material on incision of the posterior pharyngeal wall would of course give rise to the suspicion of tuberculosis, but most of these cases were due to some form of acute infectious disease. The matter of urgency of some form of surgical treatment on admission to the hospital was classified. In twenty-five instances the patient was recorded as being acutely ill and in twenty-five the operation of incision and drainage was classified as being required immediately.

#### DURATION OF SYMPTOMS

It was difficult in these cases to estimate the exact length of time during which the retropharyngeal abscess had been giving symptoms definitely attributable to its presence. The present illness merged with the previous history but, on an average, the actual symptoms due to the retropharyngeal abscess were of about four days' duration. Thus it appears that the actual abscess itself is of relatively rapid development and the effects of its presence primarily expressed by some degree of dyspnea or dysphagia come on promptly with the development of the abscess.

#### EXAMINATION

Of equal or greater importance in arrival at a correct diagnosis is the physical examination, and yet this very procedure, fraught as it is at times with the gravest risk if ineptly performed, has been the immediate cause of a fatality. Obviously, inspection and palpation of the throat offer the two major methods of examination. Neither can be carried out, so far as the nasopharynx is concerned, without providing an approach to the site of the lesion. As already pointed out, the latter varies tremendously from a point high on the posterior pharyngeal wall to a site so low as to be really retroesophageal. To achieve a satisfactory examination in a struggling child under these circumstances frequently taxes all the surgeon's skill. Not palpation alone but inspection has resulted disastrously in more than one able operator's experience. The simple insertion of a tongue depressor or the opening of the mouth with a gag has on numerous occasions resulted in transient cessation of respiration and rarely in an everlasting one. Why this should be has been discussed by various authors. It is far more than a temporary obstruc-

tion to the laryngeal airway from pressure of the tongue against the swollen pharyngeal wall, since cyanosis is not an accompanying symptom and since all normal efforts at restoration of respiration have at times proved futile. McMurray<sup>7</sup> reports four instances of alarming collapse from examination with a tongue depressor after previous incision of the abscess, one of which ended in fatality. He has suggested an association with changes in pressure on the vagus nerve. Whatever the mechanism, it is a situation to be guarded against, and a possible calamity is best avoided by the constant remembrance before a finger is lifted in the examination that the case, regardless of the variety or character of the presenting symptoms, may be one of retropharyngeal abscess. Forewarned is forearmed. In the event of such suspicion many authors agree that the most feasible, informative and safe procedure is the insertion of a gloved finger into the pharynx, without the aid of either mouth gag or tongue depressor. Palpation is far more informative than inspection, particularly in the low situated form of abscess. Lloyd<sup>9</sup> stresses the finger as the final diagnostic criterion and says that "palpation of the posterior pharyngeal wall is important even though it incurs the noisy wrath of the infant and the silent reproach of the parents." The gag reflex will take care of any trauma to the examiner's finger, and with reasonable gentleness accidental rupture of the abscess is unlikely.

The characteristic, elastic, tense feeling on palpation of the abscess is unlike anything else felt in the pharynx. The extent of the swelling can be determined without in any way impinging on the tongue or larynx.

In addition to these measures, except in cases of dire urgency, routine use should be made of a lateral roentgenogram of the neck. In twenty instances in the present series this procedure revealed a definite enlargement of the retropharyngeal space and encroachment on the pharyngeal or esophageal lumen. I cannot stress too strongly the value of this procedure and am conscious that in one instance in which it was omitted an erroneous diagnosis and the ensuing fatality might have been avoided.

#### DIAGNOSTIC ERRORS

Failure, first of all, to suspect the possibility of a retropharyngeal abscess, secondly, to interpret correctly its symptoms and, thirdly, to make the proper physical examination constitutes the first great factor in subsequent complications or even fatalities. Such a failure is not by any means always reprehensible, particularly when the case is seen in its earlier stages before the signs of abscess formation are full blown. Its possibility, however, can always be borne in mind. Greenwald and Messeloff<sup>8</sup> state that in their experience retropharyngeal abscess

escapes recognition more frequently than any other acute disease in childhood. None of their cases came to them with this diagnosis but had been treated for from one to three weeks with no suspicion of the correct diagnosis. It is only fair, however, to state that the majority of these cases had not been seen by a laryngologist, who would naturally be more likely to detect the presence of such an abscess.

Table 3 depicts the various incorrect diagnoses made in the present series.

TABLE 3  
ERRONEOUS DIAGNOSES

Diagnosis	Cases
Mumps	2
Pneumonia and bronchitis	5
Tonsillitis	5
Laryngeal obstruction	2
Peritonsillar abscess	2
Torticollis	1
Tuberculosis of the cervical spine	2
Diphtheria	5
Foreign body	1
Adenoids	0
Meningitis	3

It is at once apparent that the total number (twenty-nine) constitutes only about one sixth of the total cases, a far better showing than that just cited. Nevertheless, in no condition encountered among children is a correct diagnosis of more importance than in the case of retropharyngeal abscess. The treatment is so definite and its indications so positive and so productive of a successful outcome in the vast majority of instances that a correct diagnosis is of the utmost importance. Particularly if an erroneous diagnosis is made, efforts to pursue an incorrect form of treatment may eventuate in the most disastrous results. Such a diagnosis, however, is by no means easy, primarily because symptoms of retropharyngeal abscess can so frequently simulate other conditions. The various forms of respiratory obstruction from a slight snorting or snuffling to severe dyspnea, the difficulties in connection with dysphagia, refusal of food, choking, regurgitation and the like, and particularly the effect of the abscess on the mobility of the head and neck can all be so characteristic of a wide range of other conditions as to make this diagnosis exceedingly difficult in many instances. One fact, however, stands out in my mind above all others, namely, that so long as the examining physician retains the possibility of retropharyngeal abscess in his mind as a cause for any one of these varying symptoms and rules it out in the approved and proper technique, he is likely to make but few errors. It goes without saying that in many instances the dyspnea will be due to true laryngeal obstruction, to diphtheria, to some external tracheal compression or to a possible foreign body. The difficulty in

swallowing will frequently be due to some digestive disturbance or to some acute throat infection, such as tonsillitis or peritonsillitis. The difficult movement of the head will at times be due to some disturbance in the cervical spine or to a torticollis or, if retraction of the head is the presenting symptom, to a meningitis. However, retropharyngeal abscess must be kept in mind as a possible explanation for any one of these symptoms and its presence ruled out by inspection, palpation or x-ray examination. It may not be the diagnosis at hand, but its possibility must ever be in the physician's mind. Mention of these errors is not in any way intended to cast aspersions on the diagnostic acumen of the examining physician, usually a pediatrician, but simply to call attention to the various deceptive signs and symptoms which this one single condition can present. In two instances mumps was suspected, in five pneumonia, in five acute tonsillitis, in two laryngeal obstruction, in two peritonsillar abscess, in one acute torticollis, in two tuberculosis of the cervical spine, in five laryngeal diphtheria, in one foreign body in the larynx and in three instances some form of meningitis. All these diseases were thus simulated in their most characteristic appearance by retropharyngeal abscess to such an extent that the patients were referred to the hospital with these diagnoses. Strangely enough, in not one instance was the condition thought to be due to hypertrophied adenoids. When one considers the type of respiratory obstruction which a markedly enlarged adenoid can produce, particularly in respect to the nasal quality of the voice and the difficulty of free nasal breathing, it is rather interesting to find that none of these cases of retropharyngeal abscess were referred with this common diagnosis. A word should be said as to peritonsillar abscess, particularly among a house staff whose experience in throat infections is necessarily relatively limited, it is a common occurrence to hear of a case of peritonsillar abscess in a child. Actually, true peritonsillar abscess or so-called quinsy sore throat is extremely rare in children. A condition thus erroneously diagnosed is far more likely to be due to a retropharyngeal or lateral pharyngeal abscess, lying directly behind the posterior pillar, bulging forward and in this manner pushing the tonsil forward in such a way as to cause it to appear unduly prominent and to this extent to distort the soft palate. Examination of the throat, however, through a mouth far more widely opened than is possible in a case of peritonsillar abscess, will at once reveal the difference. There is entire lack of the edematous and hyperemic congestion of the soft palate surrounding the tonsil, and the painful swallowing and trismus so characteristic of the one condition are entirely absent in the other. Only the prominence of the palate and

tonsil on the affected side simulates a peritonsillar abscess. When one considers the diversity of treatments indicated in these varying conditions, it is at once apparent that such errors may lead to dire consequences if, in the presence of a retropharyngeal abscess, appropriate treatment is not applied, hence a tracheotomy for supposed laryngeal obstruction is a poor form of therapy for an abscess that requires only a careful and accurate incision to relieve the entire picture. Appropriate treatment for various orthopedic conditions will avail but little if they are not present. The desperate remedies required for true meningitis are quite out of place when the head retraction can be readily relieved by incising a retropharyngeal abscess.

#### SURGICAL PROCEDURES

The primary consideration in the surgical treatment of retropharyngeal abscess is drainage, accomplished by an incision, internally through the posterior pharyngeal wall or externally through the soft tissues of the neck. Occasionally, as occurred in five of the cases here reported, spontaneous rupture of the abscess occurred, constituting at times a reflection on the failure to appreciate the urgent necessity for surgical drainage. While adequate release of pus is thus usually afforded, such a rupture carries with it some risk of sudden flooding of the larynx and aspiration of infected material, which has occasionally resulted in a fatality. Myerson<sup>10</sup> reported a case of an infant of 8 months in whom sudden cyanosis and respiratory obstruction due to rupture of an unsuspected abscess required emergency tracheotomy to permit aspiration of the trachea. Hastings, in the discussion of an article by Barlow,<sup>11</sup> records the performance of emergency tracheotomy for obstruction, subsequently relieved by spontaneous rupture of the abscess. In both instances there is illustrated the fundamental importance of making a correct diagnosis, thus forestalling the necessity of these emergency measures.

Table 4 lists the operative procedures in this group of patients.

TABLE 4  
SURGICAL TREATMENT

Incision (pharyngeal)	135
External incision	2
Previous incision	5
Trans tonsil incision	2

It will be noted that simple pharyngeal incision was carried out in 83 per cent of the cases. In five instances the abscess had been previously incised before entrance of the patient into the hospital. It is startling to note that within this small group there were no less than four fatalities. While the previous incision cannot be in any way directly associated with this startling

mortality it does raise an important question, namely, that of premature incision before definite localization has occurred. Numerous authors have stressed this point. Greenwald and Messeloff<sup>4</sup> record the case of an 8 months old infant in whom the incision into a nonfluctuant mass was followed by fatal septicemia. Certainly it is generally agreed that, barring some respiratory obstruction from tissue swelling there is no haste in providing drainage unless pus is present. When definitely stated, there were in the present series sixty-six cases of recorded definite fluctuation on admission, while forty-one were said on admission to be nonfluctuant. Pus was recorded as obtained in eight-nine instances and no pus on incision in fifteen, the latter mistake due clearly to an incorrect estimate of the presence of fluctuation. Incision into acutely inflamed glandular tissue is only provocative of spread of the infection. In 13 per cent of the cases no incision was required. Perhaps these cases should not be included in a discussion of retropharyngeal abscess, but beyond the fact that actual suppuration did not occur, the cases presented classic signs of the condition. Pending the development of definite pus formation, it is advisable to treat these patients with such supportive measures as are best suited to meet the presenting symptoms. It is not to be understood that this means a neglect of definite respiratory obstruction requiring urgent treatment but in the absence of the latter with a definite swelling of the posterior pharyngeal wall which is not yet fluctuant, much can be done by the use of hot irrigations, external poultices and the administration of intravenous fluids to maintain the patient's nutrition until such time as fluctuation appears. This develops with surprising rapidity in these cases and does not necessitate any prolonged period of delay. Premature incision, however, has been recognized as being definitely disadvantageous if not actually dangerous.

The actual technic of the operation has many variations, according to the preferences of individual operators. Consideration must first of all be given to the question of anesthesia. Should general anesthesia ever be used and if so under what circumstances? Numerous authors counsel against the use of any anesthetic at any time. Lloyd advocates a general anesthetic after the initial incision, to complete the operation by extending the incision downward to the base of the cavity, together with tonsillectomy and adenoidectomy at the same time. Certainly in any case showing the slightest signs of respiratory embarrassment, any form of anesthesia would seem to be definitely contraindicated and unjustifiable. In this series, in eighteen instances, some form of general anesthetic was administered, fourteen patients receiving ether and four gas oxygen. In the other 144 cases no anes-

thetic was administered. It is my feeling that general anesthesia in these cases is to be condemned, particularly in the younger children and most assuredly in all cases in which there is the least evidence of interference with free breathing. In certain instances in the older children, when the swelling is not particularly large and when for some reason it is desirable to control the patient more adequately, a general anesthetic might be permissible, but there is certainly a risk involved in such administration which is of very grave importance. In one instance in this series, when ether was administered there was transient, alarming cessation of respiration, and, with the relaxation of the intercostal muscles, restoration of such respiration is notoriously difficult. In another case, an emergency tracheotomy was necessary because of cessation of respiration at the outset with ether administration. The congestion of the cervical circulation incident to the administration of gas, even when combined with oxygen, is such as to make it a most undesirable anesthetic for any of these cases. Any patient can be restrained for purposes of operation just as readily as can a patient for direct laryngoscopy, for which Jackson has always counseled against general anesthetic administration. Loss of laryngeal reflexes only increases the risk of aspiration aside from the danger in the presence of dyspnea or respiratory obstruction.

The position of the patient is a factor which is divided between two schools, one of which favors the sitting or upright position, the other the prone or exaggerated prone (so-called Rose) position. In four instances in the present series, patients were operated on in the upright posture. The remainder, as far as direct mention was made of the position, were operated on in the prone or exaggerated prone, so-called Rose, position. Possibly when no mention was made of the position there may have been additional instances of the sitting posture. It was formerly the custom to operate on most of these patients in the sitting position by reaching backward over the tongue with the left index finger, palpating the abscess and then inserting a knife into the anterior abscess wall blindly, and following incision by immediate reversal of the position of the patient in order to prevent aspiration of septic secretions. More and more this position has given way to the prone, in which the head is extended and direct inspection afforded of the posterior pharyngeal wall, either by the use directly of a laryngoscope, as advocated by Tucker or by the use, as favored by me, of an angulated tongue depressor which elevates the tongue and epiglottis and by reflected light affords a good view of the posterior pharyngeal wall with its attendant swelling. Thus under direct vision, the most prominent and bulging portion of the abscess can be incised its con-

tents noted and the latter slowly aspirated under complete control, the laryngeal level being above that of the abscess and thus preventing aspiration of secretions. At the same time, this direct inspection affords a view of the larynx and pharynx and thus enables the operator to detect a possible foreign body which might have been heretofore unsuspected. Subsequent stretching of the edges of the wound is afforded in the same manner without any appreciable loss of secretion into the laryngeal orifice. Likewise, there is avoided the necessity for any sudden shifting of the patient's position, and the whole process is done under direct vision.

Some authors have advocated the preliminary insertion of a bronchoscope in order to assure an unobstructed airway. In my experience this procedure is an increasing complication and in those instances in which the protruding pharyngeal wall tends to overhang the laryngeal orifice, almost a physical impossibility.

#### EXTERNAL DRAINAGE

In only two instances in this series was external drainage carried out. In both instances the patients died, though death was in neither directly attributable to this form of approach. The external incision has been advocated for those abscesses which are secondary to tuberculous infection of the spine. Babbitt,<sup>2</sup> in his summary of fifty cases, concludes that the external route should be more frequently employed in evacuating abscesses complicated by cervical adenitis. Certainly when it is felt that the cervical swelling is directly connected and continuous with the pharyngeal swelling, as is sometimes the case, external drainage would seem to be the procedure of choice. If, however, the cervical swelling is a secondary and independent adenitis (by far the commonest situation), it is hard to see how external drainage for the purpose of reaching a retropharyngeal abscess could be anything but a risky and complicated procedure.

Kistler<sup>12</sup> divides these abscesses into intra-pharyngeal and extrapharyngeal. The former result from spread of infection into the lateral wall of the pharynx. Extrapharyngeal abscesses result from inflammatory changes in the deep cervical glands leading to secondary abscess in the deepest gland of the set lying against the pharyngeal wall. Consequently the lateral pharyngeal wall is pushed medially by a fluctuating swelling which bulges into the cavity of the pharynx on one side. He feels that intrapharyngeal abscesses should be opened by incision from within and extrapharyngeal abscesses by external operation through the tissues of the neck. This extrapharyngeal abscess would appear to be really an abscess in the pharyngomaxillary fossa and as such is not really within the group com-

monly called retropharyngeal. Rarely do present to any real extent in the pharyngeal but far more frequently produce a degree of internal swelling, which is frequently best handled by external incision by the methods of Morton or Batson. I feel that only rarely is external incision advisable in true retropharyngeal abscess, even when the abscess is so deeply located as to be almost retroesophageal. The retropharyngeal drainage tract is far more direct and far less likely to become obstructed.

In two instances drainage was carried directly through the tonsil fossa after preliminary tonsillectomy. Such an abscess is really tonsillar and yet is in no sense a true tonsillar abscess. It has all the characteristics of a retropharyngeal abscess except for its extralateral position, and yet is not so deeply located as a true pharyngomaxillary fossa abscess.

In this connection, mention should be made of a type of abscess seen most commonly in children, almost exclusively males, in which swelling appears high on the pharyngeal wall directly behind the posterior pillar. Its development is slow, accompanied often by low fever. The symptoms are those of mild dysphagia, never of any appreciable dyspnea, and swelling frequently subsides without ever tending to frank pus formation or abscess, definite development of which should always be awaited before any attempt at drainage.

#### COMPLICATIONS

In 115 of these cases the outcome was recorded as uneventful. By this is meant that, following incision and drainage and presumably the recovery of pus and evacuation of the abscess, signs and symptoms of respiratory obstruction, dysphagia, fever and other evidences of the effect of the abscess, subsided in a relatively prompt fashion. This may have been within the ensuing two to three days or possibly somewhat longer. Occasional recrudescences of fever were present, rarely requiring subsequent incision of the abscess cavity. It is these cases which give rise to the notation so frequently seen on the record that the abscess was "opened and drained in the routine manner." Such cases give no cause for anxiety but doubtless the successful outcome depended primarily on prompt and accurate diagnosis and careful and correct incision and drainage performed with the least possible risk to the patient. On the other hand, in forty-seven instances the outcome was in some way complicated by one or more of the conditions listed in table 5.

There were four instances of tracheotomy, eight instances of prolonged sepsis, fourteen instances in which supplementary or secondary incision into the abscess cavity was deemed advisable, eight instances in which secondary incision of infected cervical glands was necessary.

twelve instances of prolonged fever following incision in which, for some reason or other, the temperature failed to return to normal, three instances of severe hemorrhage and finally seventeen cases of so-called late complications such

TABLE 5  
COMPLICATIONS

Tracheotomy	4
Sepsis	8
Supplementary incision	14
Incision of cervical glands	8
Prolonged fever	12
Hemorrhage	3
Late complications	17

as meningismus, pneumonitis, otitis media, sinusitis, scarlet fever or unexplained cough. Of these complications, certain ones do not require any special mention. It is obvious that if the cervical adenitis developed into abscess formation it would, in the natural course of events, require incision in its own right. The late complications could in no definite way be attributable to the abscess itself or to its drainage and might, of course, have supervened in any case, perhaps, still more probably, in a patient who had recently undergone an infection such as retropharyngeal abscess.

Tracheotomy cannot properly be called a complication, but the fact that the operation was performed undeniably constitutes a complication and hence it is here so listed. As several authors have pointed out, the procedure should, theoretically, never be necessary. If alarming dyspnea is present, the prime indication is drainage of the abscess, which will at once relieve the obstruction. Almost always tracheotomy enters the picture because the diagnosis of retropharyngeal abscess has not been made in time. Rarely so much edema of the pharyngeal tissues has occurred as to cause laryngeal obstruction even after evacuation of the abscess, but this is most exceptional.

In the present series, four tracheotomies were performed, in three instances in the face of a correct diagnosis and in one in which the abscess was unsuspected. In two instances the patient died and in the other two he was cured. In one instance the injudicious use of a general anesthetic could be traced directly as the cause of a necessary tracheotomy. It is under these circumstances that a correct diagnosis is of the utmost importance in determining the cause of apparent laryngeal obstruction and of always remembering retropharyngeal abscess as a possibility.

Supplementary incision was required as already stated, in fourteen instances. Thus, in the vast majority of cases a single adequate incision into the abscess cavity, with the edges of the wound well spread apart with a hemostat,

was sufficient to provide adequate drainage. It is true, however, that occasionally the wound edges become sealed together in such a way as to impair drainage, and these edges must be separated in order to reestablish drainage. Such secondary separation is a simple matter but obviously requires that an eye be kept on the wound until it is evident that all the infection has subsided, a result which normally takes place quite rapidly following the initial evacuation.

Prolonged fever and sepsis went more or less hand in hand, although the two were not necessarily parallel. Whether the sepsis could be viewed as a direct result of the retropharyngeal abscess is, of course, a most difficult matter to decide. The gland itself may have been simply a part of a general septicemia and is by no means to be regarded as its focus. Such sepsis, it will be noted in the summary of the deaths, was responsible for three fatalities. In the other instances, after a more or less prolonged and stormy course, at times with metastatic abscess formation, the patient recovered. It is quite probable that, under these circumstances, the actual abscess itself was but an incident in the entire septic picture. In the three instances of hemorrhage there was a mortality of 66 per cent. These hemorrhages will be discussed as a separate item.

It appears, then, that almost one fourth of the total number of patients suffered some form of complication. This is distinctly in contrast with the general feeling that the condition of retropharyngeal abscess is of little moment and a source of no special anxiety.

#### HEMORRHAGE

Severe, sudden and often recurrent profuse hemorrhage has been one of the most dreaded complications of retropharyngeal abscess. Numerous cases have been reported by various authors, all of whom agree that in the presence of typical pharyngeal hemorrhage, ligation of the common carotid artery is the one and only procedure likely to be of any avail. In the present series (table 6) there were three instances of such hemorrhage, two of which proved fatal.

In two cases there was ample warning to indicate that bleeding was taking place in or around the carotid artery. In one of these, ligation was carried out after two preliminary warning hemorrhages, in the other the procedure was not undertaken and a final severe hemorrhage caused the death of the patient. In the other instance, following external drainage, there was a single, sudden profuse hemorrhage so severe as to occasion death within sixty seconds, affording absolutely no opportunity for ligation. In most cases recorded in the literature some preliminary bleeding occurred as a warning of the necessity of drastic measures,

and ligation under these circumstances is imperative. In all probability it would have saved the third patient in this series. In the patient treated by ligation, a ligature was placed about the common carotid artery with apparent success. This procedure, however, was followed by subsequent bleeding, presumably from blood flowing down the external carotid and up the internal above the point of ligation on the common carotid artery. This secondary source of

three occurred following common carotid ligation and one without.

An analysis of the twelve deaths in this series (table 7) gives a mortality of 74 per cent. Death following this condition is, as in many other instances, a direct challenge to the surgeon as to how such fatal complications may be avoided. Obviously it is of importance to make the correct diagnosis and of almost equal importance to carry out the appropriate treatment.

TABLE 6  
HEMORRHAGE.

Name	Lesion	Symptoms	Treatment	Result
P M	Left retropharyngeal	Repeated hemorrhage from pharynx and left ear	Ligation, common carotid, transfusions	Cured
J M	Left retropharyngeal	Sudden profuse hemorrhage, vertebral	External incision and drainage	Died
O W	Right retropharyngeal	Repeated hemorrhages, internal carotid	Incision and drainage packing, transfusions	Died

bleeding is well recognized and it is agreed that common carotid ligation must be accompanied by external carotid ligation if it is essential to prevent this return flow with possible subsequent bleeding. This, however, cuts off still more completely the cerebral circulation, while common carotid ligation alone, if sufficient to control the bleeding, does not entirely deprive this portion of the brain of its blood supply. In this instance a secondary procedure was carried out in which ligatures were placed about both the internal and the external carotid and brought to the surface with a view to ligating one or the other, provided future bleeding occurred. Since this did not result, neither of these vessels was finally ligated, permitting some cerebral circulation to take place in this retrograde manner. In view of the extent of many of these retropharyngeal suppurations, it is rather remarkable that such bleeding is not more common, though the ability of the arterial wall to protect itself against infection, even when directly adjacent to suppuration, is well known. When such bleeding is apt to occur and what type of abscess one might expect it in is quite uncertain and can never be predicted. Certainly, one should always bear it in mind as a possible complication and, above all, if given sufficient warning by preliminary but not fatal hemorrhage to undertake ligation before it is too late. It is not always the carotid artery that bleeds. In one of my cases the vertebral artery was involved, and Baum<sup>13</sup> mentions a case of fatal hemorrhage, presumably from the vertebral artery in which carotid ligation was of no avail. Lifschutz<sup>14</sup> found twenty-three cases of serious retropharyngeal hemorrhage, with nineteen deaths. Of the four recoveries,

with the minimum amount of trauma and the greatest amount of skill. An analysis of fatalities should and frequently does yield information that should be of help in avoiding subsequent ones. In this series there is no real uniformity of age among the fatal cases. Two of them were the result of hemorrhage and have already been discussed. In four the incision and drainage of the abscess was followed by a generalized septicemia, in which it was difficult to discover any etiologic factor. It is doubtful here whether the local treatment had any special bearing on the matter but, as has already been pointed out, in three of these instances preliminary incision had been attempted before entrance to the hospital, suggesting the possibility that premature incision may result in a spreading of the infection beyond the natural boundaries built up by nature in an effort to localize the abscess. In one instance death followed two months after external drainage of a particularly deep seated abscess as a result of mediastinal infection. There was a possibility of premature removal of the drain, resulting in a downward extension of this infection, and the surgeon was left with a feeling that it might have been preferable to have drained even this deep seated abscess from inside rather than through the external route. In two instances sudden death occurred on the preliminary examination of the patient in one instance merely by the insertion of a mouth gag and in the second on insertion of a laryngoscope to rule out laryngeal diphtheria. The question of the sudden death on local examination of the throat fatalities from which have been reported by various other authors, constitutes a most perplexing problem. Death has been ascribed as due



to pressure of the jaw or tongue against the pharyngeal wall, but there must be more than a mere shutting off of the laryngeal airway, since the death appears to be one of collapse and suspension of circulatory function rather than of asphyxia. The heart ceases to beat and no efforts of resuscitation have proved of avail in this particular class of case. Others have sug-

gested a disturbance of the vagus center with resulting cardiac paralysis or some other neuro-circulatory disturbance the exact nature of which cannot be ascertained. Suffice it to say that one must always bear in mind, in examination of these patients, the possibility of such a sudden cardiac collapse and at least guard against anything that tends in any way to cause pressure against the pharyngeal wall. For this reason the method advocated by the writer and others of operating in the prone position and elevating the tongue and larynx with a tongue depressor or laryngoscope would appear, in general, to be the safest method of handling these cases. In two instances death occurred several hours after evacuation of the abscess where so far as

TABLE 7  
DEATHS

Name	Age	Chief Symptom	Operation	Time from Operation to Death	Cause of Death	Other Observations
1 O W	4 yrs	Hemorrhage	Incision and drainage	4 days	Hemorrhage	Sudden uncontrolled bleeding, carotid
2 P A	1 yr	Dyspnea	Laryngoscopy	5 min	Asphyxia	Sudden death on preliminary examination
3 T S	4 mos	Dyspnea, dysphagia	Spontaneous rupture	3 hrs	Respiratory failure	Died few hours after spontaneous rupture
4 L. R.	10 mos	Fever	Incision and drainage	2 wks	Pyemia	Development of general sepsis
5 S C	6 mos	Dyspnea	Incision and drainage	4 days	"	Sudden death cause unknown
6 P P	3½ mos	Dyspnea	Incision and drainage	1½ hrs	"	Died in bed mother unaware of death
7 F T	4 yrs	Dyspnea	External incision and drainage, tracheotomy	4 wks	Mediastinitis	Sepsis following external drainage
8 D S	14 mos	Cyanosis	Laryngoscopy	5 min	Respiratory failure	Sudden death on laryngoscopic examination
9 C S	1 yr	Fever	Incision and drainage	5 wks	Septicemia	
10 J M	4 yrs	Dysphagia	External incision and drainage	5 days	Hemorrhage	Sudden spontaneous rupture of vertebral artery
11 W N	15 mos	Dysphagia	Incision and drainage	7 days	Septicemia	Sudden cyanosis and death + culture
12 R. V	2 yrs 10 mos	Fever	Previous incision and drainage, no operation	3 days	Septicemia	Acutely ill comatose, good drainage

gested a disturbance of the vagus center with resulting cardiac paralysis or some other neuro-circulatory disturbance the exact nature of which cannot be ascertained. Suffice it to say that one must always bear in mind, in examination of these patients, the possibility of such a sudden cardiac collapse and at least guard against anything that tends in any way to cause pressure against the pharyngeal wall. For this reason the method advocated by the writer and others of operating in the prone position and elevating the tongue and larynx with a tongue depressor or laryngoscope would appear, in general, to be the safest method of handling these cases. In two instances death occurred several hours after evacuation of the abscess where so far as

Death from spontaneous rupture of the abscess and sudden flooding of the larynx, as reported by one author, was not apparent in any of our cases.

In general, retropharyngeal abscess must be recognized as a condition carrying potential risks and demanding, first of all, prompt recognition and, secondly, adequate treatment at an appropriate time, with all possible care in providing adequate drainage to the abscess cavity.

It is interesting to note that in this entire series there is no record that retropharyngeal abscess developed as a late or even early complication of adenoidectomy. Attention to this fact has been called by Dixon,<sup>12</sup> who explains it on the basis that the excellent drainage af-

forded by the open pharyngeal wound does not permit the sealing in or walling off of infection. Likewise, retropharyngeal abscess as a complication of tonsillectomy was not recorded in this series

## CONCLUSIONS

1 Retropharyngeal abscess, commonly regarded as a condition of no special surgical risk, still carries an average mortality of 74 per cent

2 Only the constant consideration of retropharyngeal abscess as a possible explanation for a wide range of symptoms will prevent diagnostic errors

3 Careful digital palpation of the pharyngeal wall is preferable to the use of a tongue depressor or mouth gag

4 Pharyngeal incision, without anesthesia and in the prone position, will suffice to secure drainage in almost all cases

5 Sudden severe hemorrhage must at once be controlled by carotid ligation

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RÉSUMÉ OF COMMUNICABLE DISEASES IN  
MASSACHUSETTS FOR OCTOBER, 1936

Disease	Oct. 1936	Oct. 1935	5-Yr Aver age*
Anterior Poliomyelitis.....	11	235	101
Chickenpox .....	330	351	311
Diphtheria .....	16	33	103
Dog Bite .....	718	804	451
Epidemic Cerebrospinal Meningitis	6	13	7
German Measles.....	38	39	32
Gonorrhea .....	567	595	626
Lobar Pneumonia.....	227	259	203
Measles .....	254	179	161
Mumps .....	247	333	220
Scarlet Fever.....	362	551	468
Syphilis .....	466	511	401
Tuberculosis, Pulmonary.....	286	303	303
Tuberculosis, Other Forms.....	30	41	38
Typhoid Fever.....	8	13	22
Undulant Fever.....	6	8	2
Whooping Cough.....	667	286	392

\*Based on figures for preceding five years

## RARE DISEASES

*Anterior poliomyelitis* was reported from Cambridge, 1, Lowell 2, Milford, 1, New Bedford, 2, North Brookfield, 2, Quincy, 1, Taunton, 1, Worcester, 1, total, 11

*Diphtheria* was reported from Boston, 1, Canton, 1, Chicopee, 1, Everett, 1, Fall River, 1, Lexington, 1, Lowell, 1, New Bedford, 3, Salem, 2, Stoughton, 1, Wareham, 1, Worcester, 2, total, 16

*Dysentery, bacillary*, was reported from New Bedford, 3, Stockbridge, 1, total, 4

*Epidemic cerebrospinal meningitis* was reported from Berlin, 1, Boston, 1, Holyoke 1, Malden, 1,

North Attleboro, 1, Weymouth, 1, total, 6

*Malaria* was reported from Newton, 2

*Paratyphoid fever* was reported from Cambridge, 1

*Pellagra* was reported from Boston, 1.

*Septic sore throat* was reported from Amesbury, 1, Boston, 3, Lynn, 1, Somerset, 1, total, 6

*Tetanus* was reported from Fall River, 1

*Trichinosis* was reported from Boston, 1, Brookline 1, Haverhill 1, Wakefield, 1, total, 4

*Typhoid fever* was reported from Avon 1, Bellingham 1, Billerica, 1, Chelsea, 1, Lincoln, 1, New Bedford, 1, Pittsfield, 1, Springfield, 1, total, 8

*Undulant fever* was reported from Attleboro, 1, Dalton 1, Northampton, 1, Norton, 1, Pittsfield, 1, Williamstown, 1, total, 6

Both for October and this year to date, reported cases of diphtheria and pulmonary tuberculosis reached an all time record low figure

This year to date, the reported cases of poliomyelitis reached a record low figure, despite the better diagnosis of this disease

Typhoid fever had the lowest reported October incidence ever recorded

The unusually low incidence of reported scarlet fever cases continues for the third consecutive month

The reported incidence of lobar pneumonia continues higher than the five-year average. For the first time this year there was an appreciable decline in the monthly figures of 1936 as compared with 1935

Undulant fever to date continues to be reported above last year's record high figure

Whooping cough, measles, and mumps continue above the five-year average

The reported incidence of cerebrospinal meningitis, chickenpox, German measles and tuberculosis (other forms) was not remarkable

CASE RECORDS  
*of the*  
MASSACHUSETTS GENERAL  
HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT M.D.

TRACY B MALLORY, M.D., *Editor*

CASE 22501

PRESENTATION OF CASE

A 53 year old American salesman was admitted complaining of abdominal pain and chills

Four days before entry he seemed lacking in energy and at two o'clock the following morning he was awakened with a severe shaking chill. Shortly afterward he became nauseated, vomited and complained of severe headache. He had a gnawing nonradiating pain across the midabdomen throughout the following day. A physician gave him some pills and shortly afterward the patient began to have frequent watery stools. Headache and pain in the abdomen continued and he was unable to sleep. Further medication caused the diarrhea to cease but he became quite weak and had another chill shortly before entry at which time his temperature rose to  $104.5^{\circ}$ . The skin was thought to be slightly jaundiced during this illness.

The patient's condition was such that no definite past history was obtainable. The wife, however, stated that he had complained of symptoms suggestive of ulcer but the character of these was not noted. An appendectomy for acute appendicitis was performed four years ago. His wife also stated that the patient had been very apprehensive for many years and had had various complaints. This illness, however, was the first of its kind. Two years before entry x-rays of the stomach were negative. A month before entry, x-rays of the chest were likewise said to be negative.

Physical examination showed a small, poorly nourished man with a dry icteric skin. The face was flushed. The lungs were clear. The heart was normal. The blood pressure was 110/75. There were tenderness and spasm in the right upper quadrant. A questionable mass was palpated beneath the right costal margin.

The temperature was  $100^{\circ}$ , the pulse 100. The respirations were 24.

Examination of the urine showed a specific gravity of 1.020 with a trace of albumin and a small amount of bile. The sediment was negative. The blood showed a white cell count of

16,800, 94 per cent polymorphonuclears. The stools were negative for amebae but gave a moderately strong reaction to the guaiac test. A van den Bergh test showed 3.8 milligrams bilirubin. The blood chlorides were 106 cubic centimeters.

On the second hospital day the patient had a mild chill associated with an asthmatic attack during which squeaking râles and prolonged expiration were noted. There was no chattering of the teeth and rigor appeared to be voluntary. There was slight cyanosis of the lips and nail beds. The pulse was 140, the temperature  $100^{\circ}$ . The patient was given 1/100 gram of atropin and his symptoms disappeared in five minutes. The abdominal pain previously described was slightly relieved following the administration of morphin but the jaundice persisted, the van den Bergh increased to 5 milligrams, and the white blood cell to 19,000.

On the third hospital day a laparotomy was performed. Shortly after the administration of the spinal analgesic the patient had a chill. The abdomen contained no excess fluid. The gallbladder was collapsed and there were no palpable stones in it. The pancreas was normal to palpation. A portion of the stomach and duodenum was visualized and was not remarkable. There was moderate general enlargement of the liver which was smooth, soft and otherwise normal in appearance. The common duct was moderately adherent to the structures around it. This was opened and a small amount of bile expressed. Subsequently the duct remained perfectly dry except at the time when a probe was inserted up the hepatic duct. A small needle was inserted into the portal vein and a free flow of blood obtained. Cultures of the gallbladder contents and portal vein blood showed no growth.

Shortly after operation the temperature rose to  $104^{\circ}$  and dulness with bronchial breathing was elicited in the right upper chest. An x-ray showed linear hazy bands of dulness throughout the upper half of the chest. The heart shadow was not displaced. The diaphragm was normal in position and outline. The patient became progressively worse and died on the sixth hospital day, 4 days postoperatively.

DIFFERENTIAL DIAGNOSIS

DR RICHARD H SWEET. Here we have a man who is 53 years old, a salesman, who presumably lived in this country all his life. His chief complaint is of abdominal pain and chills. We find on reading the history that the pain did not precede the chills, because it says here that four days before he came into the hospital he simply did not feel well and then at two o'clock on the following morning he was suddenly awakened by a shaking chill. No mention is

made of preceding pain. Shortly after this he had nausea, vomiting and headache. All of this goes with the onset of any severe infection. Then it mentions that he had, following that, a gnawing nonradiating pain across the midabdomen. This happened the following day, a considerable time after the onset of the symptoms. I do not know whether we should assume that he was given a cathartic. Perhaps he was or perhaps the diarrhea that he had went along with the disease.

From the past history we obtain little which is of any value in making a diagnosis, only that he had had some abdominal symptoms that the man who took the history interpreted as being suggestive of ulcer. The definite character of these symptoms was not noted.

We do not know why the x-rays of the chest were taken. If we could be sure he had a mass in his upper abdomen we might assume on the basis of his history that he had acute cholecystitis with a palpable gallbladder. The temperature is a little low considering the severity of his illness. No mention is made of eosinophilia.

We discover on reading further that they decided to operate on this patient and I wish for my peace of mind that they had not, because up to this point we might have made a diagnosis. After we read the surgeon's note we decide that there is something entirely different from what they expected to find. I imagine that the surgeon expected to find an acute gallbladder. There is no mention as to whether the common duct was dilated. I think presumably that it was not, because apparently he had a normal biliary tract, the gallbladder having been normal as well. One does not usually have to express bile from the common duct after it is opened, it usually runs out quite freely. So we have to explain this common duct obstruction which he had above the level of the cystic duct. Apparently the surgeon was puzzled by the diagnosis and inserted a needle into the portal vein. He might have done that to identify the common duct. Of course, in cases where it is difficult to identify the duct we use the needle to be sure, but it appears that a sample of blood was obtained from the portal vein for culture. If we assume that is the case the surgeon must have thought he was dealing with pyelephlebitis of the liver or portal vein obstruction. Cultures, however, were negative.

#### X-RAY INTERPRETATION

DR GEORGE W HOLMES. These portable films were taken with the film behind the patient's back and there is a certain amount of rotation. The clavicle is shortened on the right side as compared with the left, so that displacement of the heart and narrowing of the right side of the chest are in part due to the position in which

the films were taken, but I think there is some actual displacement of the mediastinal contents toward the right, which would mean that for some reason the lung on that side did not expand fully. We have a history of a film taken a month previously in which the chest was said to be normal. If we can rely on that we can rule out any chronic fibrosing process in the lung producing this picture and we would have to attribute it to collapse following operation or to an acute infection of some sort. If we went by the films alone it would be very difficult to rule out an old tuberculosis. His heart is not increased in size and his aorta as far as I can make out is normal but it is, of course, hidden to some extent by this mediastinal shadow.

#### FURTHER DIFFERENTIAL DIAGNOSIS

DR SWEET. This case puzzled me so much that before the meeting I took a few moments to jot down a few things in two columns for and against two or three diagnoses. I think there is something to be said for a diagnosis of infection of the liver by means of the portal vein, in other words, a pyelephlebitis of the liver. It is not at all unusual to see pyelephlebitis of the liver without any recognizable antecedent disease although there is usually an obvious course of infection. We have nothing here to make us suspect that he might have one. In other words, there is no history of acute appendicitis or other infection in the area which the portal vein drains. Then of course we have a negative culture from the portal vein which may or may not mean something. The increasing jaundice is rather interesting. We may of course have a degree of jaundice in pyelephlebitis but it is usually slight. Here it seems to be increasing and rather tends to make us think there was obstruction in the common duct. Of course there are many things here that might go with pyelephlebitis, such as repeated chills, intermittent fever, slight jaundice, and diarrhea.

How about liver abscess? Apparently the medical service thought about liver abscess, at least amebic abscess of the liver, because they made a note that no amebae were found in the stools. Liver abscess may be associated with repeated chills but frequently there is only one chill at the onset and repeated chills only if there is a spread of infection from the primary abscess. That may or may not be of some help. I think of more assistance is the fact that there is no elevation of the diaphragm which we usually see with abscess of the liver. The liver on the other hand was swollen at the time of operation. Here again we have no suggestion of etiology for liver abscess. If we exclude liver abscess and pyelephlebitis we must come down to a diagnosis of an acute cholangitis with either associated obstruction of the

common duct, resulting from swelling and inflammation, or possibly cholangitis superimposed on some slowly developing obstruction of the common duct, such as might be produced by carcinoma located about the cystic duct. Certainly he could have repeated chills and fever with jaundice, with swollen liver, all from acute cholangitis. The operator made a note that there were some adhesions about the common duct which might mean an acute infection, and there was apparently a large degree of obstruction of the common duct above the cystic duct and none apparently below at the time of the operation, which would seem to indicate that there was a localized area of obstruction, or possibly that the radicles in the liver were blocked off. It seems to me that it is obvious that the infection is in the liver, whether it is confined entirely to the biliary radicles, I do not know. I do not know whether he had pylephlebitis or not. I should rather incline to a diagnosis of acute cholangitis and I rather suspect that there is something more than that, possibly a carcinoma with a superimposed infection although pylephlebitis cannot be ruled out.

#### CLINICAL DISCUSSION

DR EDWARD B. BENEDICT: I saw this patient outside and sent him in. The history as given in the hospital record places the pain in the midabdomen, whereas my impression was that it was definitely lower abdominal at the start and only later shifted to the midabdomen. He also had loose stools before any cathartics were given and there was some tenderness in the lower abdomen. Though the thought of colitis crossed my mind I did not consider it very seriously. I did not make the correct diagnosis but I think it is quite possible to do so if you have that additional history.

DR SWEET: That would help a great deal in making a diagnosis of pylephlebitis. I have been looking through the history for something that might suggest acute appendicitis or other etiology for pylephlebitis.

DR. TRACY B. MALLORY: Of course, he had already had his appendix removed which ruled out the most common primary focus for pylephlebitis.

DR BENEDICT: The pain shifted eventually to the right upper quadrant. There was tenderness in that spot but no mass that we could feel.

A PHYSICIAN: You have not explained the positive guaiac in the stools.

DR C. M. JONES: Half of the cases with deep jaundice have a positive guaiac in the stools. It has no diagnostic significance at all.

A PHYSICIAN: Was a Widal done?

DR MALLORY: No.

#### CLINICAL DIAGNOSES

Acute cholangitis?

Septicemia?

#### DR RICHARD H. SWEET'S DIAGNOSES

Before Dr. Benedict's comment on the history: Acute cholangitis.

After Dr. Benedict's report: Acute pylephlebitis of the liver.

#### ANATOMIC DIAGNOSES

Acute thrombophlebitis of the portal, inferior mesenteric and superior hemorrhoidal veins.

Diverticulitis of the sigmoid with abscess formation.

Peritonitis, acute, localized.

Bronchopneumonia.

Icterus.

Nephritis, chronic vascular.

Operative wound. Cholecystostomy, choledochostomy.

#### PATHOLOGIC DISCUSSION

DR MALLORY: The postmortem examination showed a very extensive pylephlebitis. The portal radicles throughout the liver showed septic semipurulent thrombi. The main portal vein itself also showed numerous foci of thrombosis, though the thrombosis there was not complete. We were able to trace the process downward to the inferior mesenteric vein and still farther to the superior hemorrhoidal vein. Just at the junction of the sigmoid and rectum there were numerous diverticula, two of which were acutely inflamed. It then appeared evident that we were dealing with a pylephlebitis secondary to the acute diverticulitis of the sigmoid.

DR ARTHUR W. ALLEN: How frequently do you see that combination?

DR MALLORY: It is a very unusual one. I do not remember that we have had another in 10 years. We have had pylephlebitis secondary to ulcerative colitis but we have not happened to have one with this combination. Whether you get it would depend in part on where the diverticulitis was. If it was low enough it would drain through the inferior hemorrhoidal vein and would not enter the portal system.

The lungs showed collapse and bronchopneumonia, nothing else.

#### CASE 22502

#### PRESENTATION OF CASE

A 44-year-old single Portuguese-American storekeeper entered complaining of paralysis of the left leg of seven days' duration.

During the past year the patient did not feel so well as usual but had no definite complaints.

until 6 months before entry, when he had recurrent spells of gas following meals. These occurred about once a week. He had one or two attacks of abdominal cramps with moderate diarrhea containing no blood. Two and a half months before admission he caught a cold which lasted several days. There was no sore throat associated with this. Three weeks before admission following a dance he caught cold. The following day he had sharp pains in the left lower anterior chest and also in the left shoulder. This pain was aggravated by breathing and coughing. A doctor made a diagnosis of pleurisy and strapped the left chest. The patient continued to work until 1 week before admission, at which time he had some difficulty in walking home. The following morning his left leg was partially paralyzed and the right totally paralyzed. There was a sensation of pins and needles in both legs spreading up over his abdomen. On the same day he had a slight nosebleed. From that time on he remained in bed and developed some difficulty in urination and defecation. Three days before admission he developed complete urinary retention and had to be catheterized by his physician. Two days before entry he vomited after taking a senna laxative. His ankles became swollen and painful. He became incontinent of feces. He had noticed during the past 3 weeks small bruises on his left chest and upper arms. During the week before entry he developed spontaneous purpuric areas over his legs. Since the onset of the paralysis several of his stools were black and difficult to pass.

The family history is noncontributory.

He had always lived in Massachusetts. He had had two hernial repairs, the first 15 and the second 4 years before entry.

Physical examination showed a well developed and fairly well-nourished, pale, sick man lying flat in bed. There were purpuric and ecchymotic areas over the legs and upper arms. The skin and mucous membranes were very pale. The pupils were small and slightly irregular. There were several petechial hemorrhages scattered over the buccal mucosa. There was slight tenderness over the spine in the midscapular region. The heart was not enlarged. The sounds were of fair quality. The blood pressure was 130/60. The spleen and liver were both moderately enlarged to percussion although the edges were not definitely felt. The bladder was half way to the umbilicus. The abdominal reflexes were absent. Both legs showed flaccid paralysis with very slight motion on the right side. The reflexes were equal and active.

The temperature was 101°, the pulse 111. The respirations were 35.

Examination of the urine showed a specific gravity of 1.006 to 1.008 with a very slight trace of albumin. The blood showed a red cell

count of 2,240,000, a hemoglobin of 50 per cent. The white count was 15,900. The smear showed 43 per cent polymorphonuclear neutrophils, 27 per cent lymphocytes, 1 per cent eosinophils, 4 per cent myeloblasts, 18 per cent myelocytes and 7 per cent young polymorphonuclear neutrophils. There was marked stippling of the red cells with a fair number of reticulocytes and normoblasts. One stool was tarry. A Hinton test was negative. A lumbar puncture showed clear, slightly xanthochromic fluid. The initial pressure was 175. There was no response after jugular compression on either side, but abdominal compression produced a prompt rise. After 5 cubic centimeters were removed the pressure was 120, after 10 cubic centimeters the pressure was 45. The pressure could not be read after 12 cubic centimeters had been removed. An alcohol test was positive. The total protein was 328 milligrams, the sugar 87.5 milligrams. There were no cells.

He was put on constant urinary drainage. The urine showed some blood. On the third day he was transfused. He rapidly failed and died on the seventh day.

#### DIFFERENTIAL DIAGNOSIS

DR ALFRED KRANES. This patient presented a rather unusual and extremely interesting chain of symptoms and I am wondering whether we can fit them all into one pathological picture as they seem to involve many different systems. I think, however, that we probably can, although there are many data that we would like to know and that are not mentioned in the history. Certainly the rapidity of his paralysis was much more than one would expect with the usual types of cord tumor and suggests a very rapidly developing lesion in the central nervous system. The purpura and the blood picture as given here indicate a very profound disturbance of his bone marrow and just what relation that bears to the presenting symptoms of paralysis is a problem for further discussion. The lumbar puncture indicates almost a complete cord block. The neurological examination as we have it here is very inadequate, as no mention is made of the sensory examination, and we shall be unable to place the level and the extent of the cord lesion. I do not believe that the usual type of cord tumor could cause this disturbance of his bone marrow or the peripheral purpura. Of course it is possible that he has two diseases each independent of the other and occurring more or less simultaneously, one a cord tumor and the other a disease of his bone marrow, but I think it more likely that one diagnosis could adequately explain both processes.

This entire clinical picture can be explained by either one of two diseases, both having primary bone marrow lesions, one, acute myeloid

leukemia, the second, multiple myeloma. On the data presented here I find it very difficult to distinguish between the two. In favor of multiple myeloma is the rapidly developing cord compression which is due to one of two causes, either pathologic fracture of an involved vertebra or an infiltration of the cord with myelomatous tumor. Also we have evidence of some degree of renal insufficiency as shown by the urine concentration. However, the data presented on this point are so meager that one hardly feels justified in drawing any further conclusion about the state of the kidneys. The blood picture of course is not entirely in keeping with this diagnosis unless we assume that they were mistaken in the recognition of myelocytes and myeloblasts and that the cells listed as such might have been plasma cells. If such were the case, I think the diagnosis of myeloma would be quite justified. It would be very interesting and perhaps quite informative if an x-ray of his spine had been taken to rule out the possibility of a pathologic vertebra as well as x-rays of other parts of his skeleton to rule the possibility of myeloma in or out. The small amount of albumin in the urine would not lead one to believe that he had much Bence-Jones protein present. The other test of value which might help us in this diagnosis would have been a serum protein, of which there is no mention. There are a number of symptoms in this picture, however, which make a diagnosis of multiple myeloma less likely. In the first place purpura is unusual in this disease and much more common in the leukemias. Secondly, the blood picture, if correct, is much more in keeping with the diagnosis of acute leukemia, and thirdly, the pain in his left upper quadrant which radiated to his shoulder before entry is strongly suggestive of a splenic infarct which although quite common in the leukemias would be quite unusual in myeloma.

What about the rapidly developing paraplegia? Does leukemia explain that? I think it does. Weiss and Schwab in a recent report on central nervous system symptoms and lesions in leukemia report a rather unusually high percentage of such symptoms if looked for. In this patient it was quite obvious, and as far as the mechanism goes we have one of three possibilities (1) a fractured pathologic vertebra (2) an infiltration of the cord with leukemic tumor tissue, and (3) a hematomyelia. I think the last possibility is rather remote inasmuch as the lumbar puncture showed a complete block which would be quite out of keeping with the hemorrhage in the spinal cord. The xanthochromic fluid does not necessarily mean that a hemorrhage has taken place. The complete block on lumbar puncture would adequately explain this finding.

All things considered I think the most logical explanation for this man's symptoms and the findings is an acute myeloid leukemia with infiltration of the spinal cord with leukemic tumor tissue and a splenic infarct as well as the other customary findings in patients dying with this disease. I cannot completely exclude multiple myeloma but I think the weight of evidence is in favor of myeloid leukemia.

#### CLINICAL DIAGNOSIS

Myelogenous leukemia (acute) with compression of the spinal cord.

#### DR. ALFRED KRANES' DIAGNOSES

- 1 Acute myelogenous leukemia.
- 2 Multiple plasma cell myeloma.

#### ANATOMIC DIAGNOSES

Multiple myeloma, probably atypical plasma cell type, with metastases to the lungs and the bronchial lymph nodes.  
Extramedullary myelopoiesis liver, spleen, kidney and lymph nodes.  
"Myeloma kidney."  
Pyelonephritis, acute.  
Cystitis, acute and chronic.  
Prostatitis, acute and chronic.  
Hydrothorax, right, slight.  
Pulmonary emphysema.  
Hemorrhage into the ileum, old.  
Multiple petechiae of the legs, the pericardium, the kidneys and the colon.  
Arteriosclerosis, mitral valve moderate, aorta slight.  
Healed hernial scars, bilateral with recurrent right inguinal hernia.

#### PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY. Dr. Kranes has come to what I believe was the logical conclusion from the data which were presented to him. They were recorded exactly as they appeared in the hospital record. After the autopsy however I was curious as to the blood findings and succeeded in procuring one of the blood smears on which the intern's differential count had been made. I was unable to find any plasma cells but I did feel that there were many more immature red cell elements both erythroblasts and normoblasts than he had found. That might have been of some help to Dr. Kranes in suggesting the type of anemia seen with bone marrow replacement rather than the type which is characteristic of leukemia.

The most significant finding at autopsy was a large tumor mass which involved the vertebral column from the level of the first to the fourth dorsal vertebrae. Throughout this area it almost completely replaced the bodies of the vertebrae and at its upper end it projected in-

until 6 months before entry, when he had recurrent spells of gas following meals. These occurred about once a week. He had one or two attacks of abdominal cramps with moderate diarrhea containing no blood. Two and a half months before admission he caught a cold which lasted several days. There was no sore throat associated with this. Three weeks before admission following a dance he caught cold. The following day he had sharp pains in the left lower anterior chest and also in the left shoulder. This pain was aggravated by breathing and coughing. A doctor made a diagnosis of pleurisy and strapped the left chest. The patient continued to work until 1 week before admission, at which time he had some difficulty in walking home. The following morning his left leg was partially paralyzed and the right totally paralyzed. There was a sensation of pins and needles in both legs spreading up over his abdomen. On the same day he had a slight nosebleed. From that time on he remained in bed and developed some difficulty in urination and defecation. Three days before admission he developed complete urinary retention and had to be catheterized by his physician. Two days before entry he vomited after taking a senna laxative. His ankles became swollen and painful. He became incontinent of feces. He had noticed during the past 3 weeks small bruises on his left chest and upper arms. During the week before entry he developed spontaneous purpuric areas over his legs. Since the onset of the paralysis several of his stools were black and difficult to pass.

The family history is noncontributory.

He had always lived in Massachusetts. He had had two hernial repairs, the first 15 and the second 4 years before entry.

Physical examination showed a well-developed and fairly well-nourished, pale, sick man lying flat in bed. There were purpuric and ecchymotic areas over the legs and upper arms. The skin and mucous membranes were very pale. The pupils were small and slightly irregular. There were several petechial hemorrhages scattered over the buccal mucosa. There was slight tenderness over the spine in the midscapular region. The heart was not enlarged. The sounds were of fair quality. The blood pressure was 130/60. The spleen and liver were both moderately enlarged to percussion although the edges were not definitely felt. The bladder was half way to the umbilicus. The abdominal reflexes were absent. Both legs showed flaccid paralysis with very slight motion on the right side. The reflexes were equal and active.

The temperature was 101°, the pulse 111. The respirations were 35.

Examination of the urine showed a specific gravity of 1.006 to 1.008 with a very slight trace of albumin. The blood showed a red cell

count of 2,240,000, a hemoglobin of 50 per cent. The white count was 15,900. The smear showed 43 per cent polymorphonuclear neutrophils, 27 per cent lymphocytes, 1 per cent eosinophils, 4 per cent myeloblasts, 18 per cent myelocytes and 7 per cent young polymorphonuclear neutrophils. There was marked stippling of the red cells with a fair number of reticulocytes and normoblasts. One stool was tarry. A Hinton test was negative. A lumbar puncture showed clear, slightly xanthochromic fluid. The initial pressure was 175. There was no response after jugular compression on either side, but abdominal compression produced a prompt rise. After 5 cubic centimeters were removed the pressure was 120, after 10 cubic centimeters the pressure was 45. The pressure could not be read after 12 cubic centimeters had been removed. An alcohol test was positive. The total protein was 328 milligrams, the sugar 87.5 milligrams. There were no cells.

He was put on constant urinary drainage. The urine showed some blood. On the third day he was transfused. He rapidly failed and died on the seventh day.

#### DIFFERENTIAL DIAGNOSIS

DR ALFRED KRANES. This patient presented a rather unusual and extremely interesting chain of symptoms and I am wondering whether we can fit them all into one pathological picture as they seem to involve many different systems. I think, however, that we probably can, although there are many data that we would like to know and that are not mentioned in the history. Certainly the rapidity of his paralysis was much more than one would expect with the usual types of cord tumor and suggests a very rapidly developing lesion in the central nervous system. The purpura and the blood picture as given here indicate a very profound disturbance of his bone marrow and just what relation that bears to the presenting symptoms of paralysis is a problem for further discussion. The lumbar puncture indicates almost a complete cord block. The neurological examination as we have it here is very inadequate, as no mention is made of the sensory examination, and we shall be unable to place the level and the extent of the cord lesion. I do not believe that the usual type of cord tumor could cause this disturbance of his bone marrow or the peripheral purpura. Of course it is possible that he has two diseases each independent of the other and occurring more or less simultaneously, one a cord tumor and the other a disease of his bone marrow, but I think it more likely that one diagnosis could adequately explain both processes.

This entire clinical picture can be explained by either one of two diseases, both having primary bone marrow lesions, one, acute myeloid



leukemia, the second, multiple myeloma. On the data presented here I find it very difficult to distinguish between the two. In favor of multiple myeloma is the rapidly developing cord compression which is due to one of two causes, either pathologic fracture of an involved vertebra or an infiltration of the cord with myelomatous tumor. Also we have evidence of some degree of renal insufficiency as shown by the urine concentration. However, the data presented on this point are so meager that one hardly feels justified in drawing any further conclusion about the state of the kidneys. The blood picture of course is not entirely in keeping with this diagnosis unless we assume that they were mistaken in the recognition of myelocytes and myeloblasts and that the cells listed as such might have been plasma cells. If such were the case, I think the diagnosis of myeloma would be quite justified. It would be very interesting and perhaps quite informative if an x-ray of his spine had been taken to rule out the possibility of a pathologic vertebra as well as x-rays of other parts of his skeleton to rule out the possibility of myeloma in or out. The small amount of albumin in the urine would not lead one to believe that he had much Bence-Jones protein present. The other test of value which might help us in this diagnosis would have been a serum protein, of which there is no mention. There are a number of symptoms in this picture, however, which make a diagnosis of multiple myeloma less likely. In the first place purpura is unusual in this disease and much more common in the leukemias. Secondly, the blood picture, if correct, is much more in keeping with the diagnosis of acute leukemia, and thirdly, the pain in his left upper quadrant which radiated to his shoulder before entry is strongly suggestive of a splenic infarct which although quite common in the leukemias would be quite unusual in myeloma.

What about the rapidly developing paraplegia? Does leukemia explain that? I think it does. Weiss and Schwab in a recent report on central nervous system symptoms and lesions in leukemia report a rather unusually high percentage of such symptoms if looked for. In this patient it was quite obvious, and as far as the mechanism goes we have one of three possibilities: (1) a fractured pathologic vertebra, (2) an infiltration of the cord with leukemic tumor tissue, and (3) a hematomyelia. I think the last possibility is rather remote inasmuch as the lumbar puncture showed a complete block which would be quite out of keeping with the hemorrhage in the spinal cord. The xanthochromic fluid does not necessarily mean that a hemorrhage has taken place. The complete block on lumbar puncture would adequately explain this finding.

All things considered I think the most logical explanation for this man's symptoms and the findings is an acute myeloid leukemia with infiltration of the spinal cord with leukemic tumor tissue and a splenic infarct as well as the other customary findings in patients dying with this disease. I cannot completely exclude multiple myeloma but I think the weight of evidence is in favor of myeloid leukemia.

#### CLINICAL DIAGNOSIS

Myelogenous leukemia (acute) with compression of the spinal cord

#### DR. ALFRED KRANES' DIAGNOSES

1. Acute myelogenous leukemia
2. Multiple plasma cell myeloma

#### ANATOMIC DIAGNOSES

Multiple myeloma, probably atypical plasma cell type with metastases to the lungs and the bronchial lymph nodes  
Extramedullary myelopoiesis: liver, spleen, kidney and lymph nodes  
"Myeloma kidney"  
Pielonephritis, acute  
Cystitis, acute and chronic  
Prostatitis, acute and chronic  
Hydrothorax, right, slight  
Pulmonary emphysema  
Hemorrhage into the ileum, old.  
Multiple petechiae of the legs, the pericardium, the kidneys and the colon  
Arteriosclerosis: mitral valve, moderate, aorta, slight  
Healed hernial scars: bilateral, with recurrent right inguinal hernia

#### PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY: Dr. Kranes has come to what I believe was the logical conclusion from the data which were presented to him. They were recorded exactly as they appeared in the hospital record. After the autopsy, however, I was curious as to the blood findings and succeeded in procuring one of the blood smears on which the intern's differential count had been made. I was unable to find any plasma cells but I did feel that there were many more immature red cell elements both erythroblasts and normoblasts, than he had found. That might have been of some help to Dr. Kranes in suggesting the type of anemia seen with bone marrow replacement rather than the type which is characteristic of leukemia.

The most significant finding at autopsy was a large tumor mass which involved the vertebral column from the level of the first to the fourth dorsal vertebrae. Throughout this area it almost completely replaced the bodies of the vertebrae and at its upper end it projected in-

ward to press upon the spinal cord at about the level of the first dorsal. It had also eroded through the bodies of the vertebrae and projected into the left pleural cavity involving on its way the sympathetic chain. Another tumor mass was found in the lumbar region which extended anteriorly into the retroperitoneal tissues but had not involved the spinal canal. Innumerable smaller areas of involvement were found throughout the remainder of the spine, the ribs, sternum, and even the costal cartilages. One metastasis was found in the lungs and a bronchial gland also contained tumor. The other significant findings at autopsy were moderate enlargement of the liver and spleen and very marked enlargement of the kidneys, the pair of which weighed 500 grams. There were also numerous internal evidences of the purpura which had been evident on the skin. Scattered hemorrhages were present throughout the large bowel and one area of massive hemorrhage was present in the ileum. A submucosal hemorrhage in the bladder produced an appearance suggesting a polypoid cystitis.

The microscopic examination proved of unusual interest. The tumors in the spine, the other bones and the bronchial lymph nodes were similar enough in appearance to make the assumption of a common origin a safe one. Each of the tumors, however, showed considerable variety in the cytology of the component cells. Many of these cells were more or less suggestive of plasma cells in appearance, although perfectly typical plasma cells with cart-wheel chromatin were not found. Within each of the tumor areas, however, many of the cells were much larger and showed ovoid or horseshoe-shaped nuclei containing a large nucleus but little chromatin. Multinucleated cells were very infrequent and none of the cells either in the fixed tissues or in impression smears made at the time of autopsy and stained with Wright's

stain and with Goodpasture's oxidase method showed any development of granules in the cytoplasm. It was felt, therefore, that a myelocytic type of myeloma could be safely ruled out. The sections of the liver and spleen proved quite interesting. The sinusoids were frequently dilated and contained many nucleated cells, among which myelocytes, erythroblasts, normoblasts and stem cells could be identified. Since cells of the red and white series were present in approximately equal proportions, it was felt that this represented extramedullary hematopoiesis rather than leukemic infiltration. This is a common finding in children in response to any process which produces a severe anemia but is quite uncommon in adults no matter how severe the process. It is much more apt to be seen in adults, as in this case, in the so-called myelophthisic anemias where for one reason or another hematopoiesis has been crowded out of the bone marrow. The enlargement of the kidneys proved to be due to an especially marked lesion of the type which is coming to be known as a "myeloma kidney." Some of the convoluted tubules, but a great majority of the straight tubules, were filled with unusually large and dense hyaline casts. That these were different from ordinary casts, however, was shown by the fact that around many of them foreign body giant cells had formed, a finding never observed in the ordinary types of nephritis.

To sum up then, we have multiple tumors throughout the osseous system, the majority of them rather small but two quite large. There were two metastases outside of the bones. The liver and spleen showed hematopoiesis and myelopoiesis but no involvement by tumor, and the kidneys were of the type characteristically seen with multiple plasma cell myeloma. The histology of the tumors was consistent with, though not entirely characteristic of this condition. A final diagnosis of atypical plasma cell myeloma seemed on the whole most reasonable.

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## HORMONES AND HUMAN BEHAVIOR

In his address at the symposium, "Factors Determining Human Behavior", which was a part of the Harvard Tercentenary Conference of Arts and Sciences, Dr. James B. Collip<sup>1</sup> laid particular stress on the significance of the internal secretions in relation to human behavior. As Hoskins<sup>2</sup> has said, "The evidence is now conclusive that what we are—physically, mentally, sexually and emotionally—depends in no small measure upon the functions of the endocrine glands."

Dr. Collip explained this relatively greater importance in man than in lower animals as being due to the more elaborate development of the frontal lobes of the brain, resulting in impulses to the ductless glands that originate in the higher brain centers, arising from feelings not only of consciousness but also of self-consciousness. The interrelations of the nervous and endocrine systems are many, and normal behavior depends upon proper correlation of the two. Furthermore, he said, individual behavior dependent as it is upon conscious, self-conscious

and unconscious life, must likewise be profoundly influenced by the particular reciprocal relations of the ductless glands and the nervous system.

Proper functioning of bodily functions is dependent, particularly in the higher forms of animal life, upon the preservation of uniform composition of the body or tissue fluid, the 'milieu interne' of Claude Bernard. This internal environment, Dr. Collip added, is the only one of the three chief governors of human behavior that can be affected by the hormones directly. The other two, hereditary background and external environment, may produce indirect changes in the hormone patterns of the internal environment. Thus, human behavior, he concluded, can be influenced by the hormones through each of the three determining factors.

## REFERENCES

1. Collip J. B. Hormones. Scientific Monthly 43:411 (Nov) 1936.
2. Hoskins R. G. The Tides of Life. New York W. W. Norton and Co. 1933.

## EUTHANASIA OPPOSED IN ENGLAND

On December 1, 1936, the House of Lords refused to enact legislation to permit physicians to relieve human suffering by euthanasia. Leading opponents of the proposed measure included Lord Dawson of Penn, the King's physician and the Archbishop of Canterbury. The vote stood at 14 in favor of the bill and 35 against it.

Lord Ponsonby, who advocated the passage of the bill, recorded the prediction that in the course of time Parliament would endorse the measure. He placed the responsibility for the action on the alliance of the medical profession and the prelates of the Church of England.

The Archbishop of Canterbury expressed the opinion that the medical profession should assume all responsibility for the attitude of members toward this question, stating that he would "trust the judgment and honor of the medical profession" at the same time plainly indicating that there may be occasions when it is "morally legitimate to shorten the life of pain."

It is very probable that most of the religious denominations are disinclined to adopt a policy relating to euthanasia, and it is not at all likely that organized medicine in this country would commit itself to a general approval of this practice, because it might impose difficulties of procedure and complications which would outweigh its blessings. One can readily imagine many circumstances which would arouse suspicion as to the propriety of resorting to euthanasia except through adequately safeguarded legal regulations, and even with this resource society at large is not apparently ready to take this step.

For the comfort of the incurably ill, the public may be assured that the medical profession has many resources to assuage the distress of

body and mind after there is no expectation of recovery

There will undoubtedly be cases when courageous and sympathetic physicians will, under suitable conditions, relieve the incurably sick person without the technical authority conferred by law

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

HOMANS, JOHN M D Harvard University Medical School 1903 Clinical Professor of Surgery, Harvard University Medical School Professor of Surgery, 1936-1937, Yale University School of Medicine His subject is "The Treatment of Elephantiasis of the Legs A Preliminary Report" Page 1099 Address 721 Huntington Avenue, Boston, Mass

KAZANJIAN, V H M D Harvard University Medical School 1921 D M D F A C S Professor of Clinical Oral Surgery, Harvard University Dental School Visiting Surgeon, Massachusetts General Hospital Surgeon for Plastic Operations, Massachusetts Eye and Ear Infirmary Visiting Surgeon, Oral and Plastic Surgery, Boston City Hospital Consulting Surgeon of the Collis P Huntington Memorial Hospital, the New England Deaconess Hospital, the Palmer Memorial Hospital, the Beth Israel Hospital, the Cambridge Hospital, and the Newport Hospital, Newport, R I His subject is "The Repair of Contractures Resulting from Burns" Page 1104 Address 475 Commonwealth Avenue, Boston, Mass

RICHARDS, LYMAN A.B., M D Harvard University Medical School 1919 F A C S Surgeon in Otolaryngology, Peter Bent Brigham Hospital Consultant in Otolaryngology, New England Hospital for Women and Children Consultant in Bronchoscopy, Union Hospital, Fall River Associate in Otolaryngology, New England Deaconess and New England Baptist Hospitals His subject is "Retropharyngeal Abscess" Page 1120 Address 319 Longwood Avenue, Boston, Mass

### The Massachusetts Medical Society

#### FOURTH ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning December 14

##### Bristol North

Thursday, December 17 at 4 00 p m., at the Morton Hospital, Taunton Subject The Prognosis of Heart Disease Instructor

Ashton Graybiel Arthur R Crandell, Chairman

##### Bristol South (Fall River Section)

Monday, December 14, at 4 00 p m., at the Stevens Clinic of the Union Hospital, Fall River Subject Suppurative Lung Disease, Lung Abscess and Bronchiectasis Instructor F T Lord Howard P Sawyer, Co-Chairman

##### Bristol South (New Bedford Section)

Friday, December 18, at 4 00 p m., at St Luke's Hospital, New Bedford Subject Anesthesia (a) Drugs in Anesthesia (b) General Care of Patient in Anesthesia. Instructor S C Wiggin Robert H Goodwin, Co-Chairman

##### Norfolk South

Monday, December 14, at 8 30 p m., at the Quincy City Hospital, Quincy Subject Blood Diseases The Hemoglobin and Red Blood Cells in Relation to Disease Instructor M B Strauss David L Belding, Chairman

##### Plymouth

Tuesday, December 15, at 4 00 p m., at the Brockton Hospital, Brockton Subject Diabetes General Plan of Treatment in Uncomplicated Cases, Diet, Insulin (Regular and Protamine), Exercise Instructor Reginald Fitz W H Pulsifer, Chairman

##### Worcester North

Friday, December 18, at 4 30 p m. at the Bank Hospital, Fitchburg Subject Acute Abdominal Emergencies Instructor H M Clute Edward A Adams, Chairman

### MISCELLANY

#### IVY POISON PREVENTIVE

One hundred and thirty men at the CCC veterans camp, MC 64 Morristown N J, served as willing guinea pigs to prove that there is a preventive and a definite cure for ivy poison Lieutenant Colonel J M Blank U S Medical Reserve Corps, and Dr Arthur F Coca Pearl River, N Y, physician whom he called in as a consultant in the work, describe its results (*Journal of Allergy*, September)

From January the entire command of "2217 V" which includes the Morristown camp, was engaged in mosquito control in New Jersey This involved much labor and scouting in swampy areas where poison ivy and poison sumac abound As a result, there had been 129 cases of poison ivy by April 24, sixteen of them so bad that they had required hospital care The morale of the camp, the report continues, was being adversely affected, and still the number of cases increased

No really critical tests had ever been made of prevention of the irritation by immunizing with injections into the blood stream, the best method to

use if it would work. The doctors determined to try this way

They divided the men into three groups. The first received a fairly weak injection of the actual irritant from poison ivy plants in four weekly doses. This caused their blood to prepare a material which would fight off the poison itself when they came into accidental contact with the plants just as people vaccinated against typhoid fever acquire immunity to that disease. Of the 45 men in this group, only 9 reported poison ivy infection in the 6 weeks following their treatment. A second group was given similar injections, 12 times as strong as the first. The ensuing 6 weeks saw 3 cases develop among them. A third lot, of 45 men again, got no injections. Of these 45, 30 got poison ivy. Members of each group were in each of the work gangs.

The report concludes on a faintly regretful note. As each man was found to have the skin irritation, he was given the anti-poison ivy injections. Routine inspections saw to it that the cases were diagnosed early. The number of cases decreased from the hundreds earlier in the year to none at all in August. There was one case in September but that was of a man who had not been immunized.

The regret of the doctors lies in the fact that because of this practice of treating the men as they became ill, nobody was left unvaccinated at the end of the treatments who could be used to tell quite certainly whether the men were being exposed as much as before to the poisoning.—*Science News Letter*, November 21, 1936

### THE DISTRIBUTION OF PHYSICIANS

Former studies have been mainly concerned with determining the ratio of population to physicians as a measure of medical service available in the country concerned. According to these data the ratio is much lower in the United States as compared with the different European countries. While the European countries have from two to four times as many persons per physician as the United States the complaint of a surplus of physicians is common to nearly every country. The report of the Commission on Medical Education<sup>1</sup> stated that there were approximately 780 persons per physician in the United States and estimated on actuarial bases that the probable population ratio in this country by the year 1950 would be 650 which seemed conclusive evidence of a definitely increasing oversupply of physicians.

Leland's study analyzes more closely the geographic distribution of physicians in the United States and shows a varying ratio in the different sections of the country as indicated by a ratio of 533 in Colorado, 614 in New York, 621 in California, 671 in Massachusetts, 966 in New Jersey, 1040 in Louisiana, 1340 in North Dakota, and 1400 in South Carolina. It is arbitrarily assumed that the number of people outside incorporated towns and dependent on the medical facilities in each city is approximately equal—that is, that nearly the same number of

persons would be drawn to a city of 1,000 to 5,000 as to one of 100,000 or over.

Leland claims that there is no absolutely accurate method by which to determine the amount of medical service available for a community or the number of persons served by physicians according to the size of the town in which they are located. It is manifestly evident that the extent of patronage in any locality is determined by such diverse factors as good roads, telephones, competition of medical facilities in adjoining communities, income of the population, recommendations of friends and relatives, and so forth. In the large cities the greater number of physicians confining their practice to one of the recognized medical specialties is a further important factor in arriving at an estimation of the general medical service. The study also takes into consideration the number of physicians engaged in teaching and administrative work, or otherwise not in active practice. Any assertions that the medical service of the average community can be measured by the number of physicians within its immediate geographic limits are contrary to well known facts.—*Federation Bulletin* 22 No. 11 (Nov.) 1936

### REFERENCE

1. Final Report of the Commission on Medical Education, New York: Office of the Director of Study, 1932.

### THE MASSACHUSETTS BOARD OF REGISTRATION IN MEDICINE

#### PRELIMINARY REPORT ON EXAMINATION NOVEMBER, 1936

	Approved	Not Approved	Total
Repeaters			
(3 or less)	16	65	
(4 or more)	3	43	127
First Time	53	41	94
	72	149	221

### LUNCHEON FOR MISS BISSELL, FOUNDER OF THE CHRISTMAS SEAL IN THE UNITED STATES

An honorary luncheon for Miss Emily P. Bissell will be held at the Twentieth Century Club, 3 Joy Street, at one o'clock, December 11. A charge of \$1.00 will be made.

Miss Bissell will contribute to the program.

Dr. Horace Paine Stevens, whose father living in Cambridge was cured of tuberculosis in 1865 after being treated by Dr. Henry I. Bowditch, will also speak. His subject is Tuberculosis. Then Dr. Alton S. Pope, Director of the Division of Tuberculosis, State Department of Public Health, will speak on Tuberculosis Now.

There will be on display a very extensive exhibit of the tuberculosis Christmas Seals of the nations, including of course our own.

AN HONOR CONFERRED ON DR. A. W.  
SELLARDS

The Laveran Gold Medal of the Société de Pathologie Exotique of Paris has been conferred upon Dr. A. W. Sellards, Associate Professor of Tropical Medicine at the Harvard University Medical School. This medal was conferred first in 1927 upon Sir Arnold Theiler, in 1929 upon Edm. Sergeant, in 1931 upon J. Rodhain, in 1933 upon E. Roubaud.

Dr. Sellards has been associated with the French investigators in the study of yellow fever since 1927. This work has culminated in the development of an effective vaccine which has now been employed for the protection of more than 20,000 persons. Dr. Sellards first demonstrated that the virus of yellow fever could be preserved in vitro and transported, and in 1928 he brought the first strain from Africa which was established at once in several laboratories in Europe, London, New York City, and Boston.

## CORRESPONDENCE

## A HUMILIATING MISSTATEMENT

Boston, December 2, 1936

Editor, *New England Journal of Medicine*,

At a regular meeting of the Boston Society of Anesthetists held last evening it was suggested that the following editorial in the *Rhode Island Medical Journal* (19:182 [Nov.] 1936) be brought to your attention:

"TO THE AMERICAN COLLEGE OF SURGEONS

On October 16, 1846, at the Massachusetts General Hospital in Boston, William Thomas Green Morton first demonstrated what we now know as Surgical Anesthesia. In the words of William Osler, before October 16, 1846, surgical anesthesia did not exist—within a few months it became a world-wide procedure, and the full credit for its introduction must be given to William Thomas Green Morton, who on the date mentioned demonstrated at the Massachusetts General Hospital the simplicity and safety of ether anesthesia. That demonstration is the cornerstone of the foundation of Modern Surgery. If it had failed of success, it is unlikely that the American College of Surgeons would now exist. The October *Bulletin of the American College of Surgeons* states: 'The art and science of anesthesia have rapidly advanced since 1844 and 1846 when Crawford Long and Daniel Morton made their historic discoveries.' A misstatement humiliating to all of us, slighting the name of a great benefactor and a topic of professional pride. A comparable error has not been recorded since the *London Dictionary of Dates*, in 1851, stated that 'the discovery was first made by Mr. Thomas Morton of Boston. For ignorance of the most momentous event in the history of surgery, the *Dictionary of Dates* might be forgiven, but not the official publication of the world's greatest surgical society.' A. H. M.

Sincerely yours,

RUSSELL F. SHELDON, M.D., Secretary

31 Pluckney Street, Boston

## RECENT DEATHS

**CUTLER**—CHARLES NEWTON CUTLER, M.D., a retired physician and a member of the Massachusetts Medical Society, died in Plainfield, New Hampshire, September 5, 1936.

Dr. Cutler was born in Chelsea, Massachusetts, in 1875, the son of Dr. William T. Cutler and Mrs. Annie (Alden) Cutler. He graduated from the Harvard Medical School in 1898. After retirement, Dr. Cutler lived for ten years in Plainfield, except when he was visiting in the South.

**TUCKER**—GEORGE EVERETT TUCKER, M.D., of Salem, Massachusetts, died at the Salem Hospital, November 30, 1936. Dr. Tucker was born in Hyde Park, Massachusetts, where he prepared for Bowdoin College from which he graduated in 1905. He then entered the Bowdoin Medical College and graduated therefrom in 1908, joined the Massachusetts Medical Society in 1908, and was later appointed to membership on the staff of the Salem Hospital, serving to the time of his decease.

He was a member of the Massachusetts Medical Society, the Essex County Bowdoin Alumni Association, the Salem Kiwanis, and the Salem Country Clubs.

Dr. Tucker's widow, Mrs. Rachel R. (Dillon) Tucker, a daughter, Miss Barbara Tucker, and a brother, Herbert Tucker, of Arlington, survive him.

**McMAHON**—FRANCIS JOSEPH McMAHON, M.D., of 376 Washington Street, Brookline, Massachusetts, died at his home, December 1, 1936. He was born in 1884, the son of Mr. and Mrs. Thomas F. McMahon, and was educated at Brookline High School, Holy Cross College, and graduated from the Tufts College Medical School in 1911.

Dr. McMahon was formerly a member of the Massachusetts Medical Society and was a member of the Holy Cross Club, St. Lawrence's Chapter, M. C. O. F., and the Tufts College Medical School Alumni Association.

For several years Dr. McMahon was associated with the Welfare Department of Brookline.

In addition to his parents and his widow, Mrs. Mildred Ashley McMahon, Dr. McMahon is survived by a daughter, Miss Marie, a son, Francis J., Jr., a brother, Peter, and a sister, Miss Mary McMahon.

**SWAIN**—HOWARD TOWNSEND SWAIN, M.D., of 226 Commonwealth Avenue, Boston, died at his home, December 6, 1936.

Dr. Swain was born in 1868 and, after graduating from Phillips Exeter Academy, entered the Harvard Medical School, graduating therefrom in 1897.

He served six years at the Massachusetts General Hospital and the Boston Lying-in Hospital and later served on the staffs of these hospitals for several years.

He was a Fellow of the Massachusetts Medical Society and the American Medical Association.

Dr. Swain is survived by his widow, Mrs. Harriet

French Swain a son, Howard T Swain, Jr., of Denver Colorado, and two daughters Mrs C Rodgers Burgin, of Milton, and Mrs Henry K U Beecher of Boston

Hvannis—December 22 1936 January 26 1937—Dr Paul Morton  
Fall River—December 28, 1936 January 25 1937—Dr Eugene McCarthv

## NOTICES

### SUNDAY AFTERNOON LECTURES AT THE HARVARD MEDICAL SCHOOL

The Faculty of Medicine of Harvard University offers a course of free public lectures on medical subjects to be given at the Medical School Building D Longwood Avenue Boston on Sunday afternoons beginning next January 10 and ending March 21 The lectures will begin at four o'clock and the doors will be closed at five minutes past the hour No tickets are required.

The schedule is as follows January 10 Professor Philip Drinker, Air Conditioning and Health January 17, Dr Soma Weiss Blood Pressure—Low and High, January 24 Dr Tracy J Putnam Pain and Its Treatment January 31 Dr C Macfie Campbell, Social Stress and Mental Health February 7 Dr William T Salter Cancer February 14 Dr Edward D Churchill Surgical Aid in Lung Diseases February 21 Dr Theodore L Terry "The Care of the Eyes February 28 Dr Louis K. Diamond The Anemic Child March 7 Dr William H Robey, Preparing for a Comfortable Old Age March 14 Dr Arthur Hertig Abnormal Terminations of Early Pregnancy and March 21 Dr Joseph C Aub Glands of Internal Secretion and Human Activity

### MASSACHUSETTS MEMORIAL HOSPITALS

There will be a luncheon meeting of the Surgical Section in the Aid Association Room ground floor Talbot Memorial 82 East Concord Street, Boston on Friday December 11 1936 at 12 noon

Surgical deaths during the month of October will be discussed

MILO C GREEN *Secretary*

### CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

Clinic	Date	Orthopedic Consultant
Haverhill—	January 6 1937—	Dr Arthur T Legg
Brockton—	January 14 1937—	Dr George W Van Gorder
Salem—	January 4 1937—	Dr Harold C Bean
Gardner—	January 12 1937—	Dr Mark H. Rogers
Greenfield—	December 11 1936 January 8 1937—	Dr Harry R Wheat.
Pittsfield—	December 14 1936 January 18 1937—	Dr Francis A. Slowick.
Springfield—	December 16 1936 January 20 1937—	Dr Garrv deN Hough Jr
Worcester—	December 18 1936 January 15 1937—	Dr John W O'Veara
Lowell—	December 19 1936 January 30 1937—	Dr W Russell MacAusland

### BOSTON CITY HOSPITAL

The Ophthalmic Service of the Boston City Hospital invites physicians to attend the Henry Willard Williams Memorial Lecture Wednesday, December 16 1936 at 8 15 p m., in the Cheever Amphitheater

This will be given by Dr Allen Greenwood who is Consulting Ophthalmic Surgeon at the Boston City Hospital and the Massachusetts Eye and Ear Infirmary Dr Greenwood was formerly President of the American Academy of Ophthalmology and Oto-Laryngology His subject is "History of Ophthalmology in New England.

Dr Benjamin Sachs Professor of Ophthalmology at Tufts College Medical School will preside

Physicians medical students and nurses are cordially invited.

JAMES W MANARY M.D. *Medical Director*

### MASSACHUSETTS INSTITUTE OF TECHNOLOGY

#### DEPARTMENT OF BIOLOGY AND PUBLIC HEALTH

Invitations to attend the Ninth Massachusetts Institute of Technology Delta Omega Lecture have been issued.

Time Wednesday December 16 1936 at 5 00 p m Place Room 10 250 Massachusetts Institute of Technology Cambridge

Subject The Place of Health Education in National Health Programs

Illustrated by motion pictures in natural color showing school children and scenic beauties in various countries

Speaker Clair E Turner, Dr.P.H. Professor of Biology and Public Health Massachusetts Institute of Technology

The lecture is open to all who are interested

### MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p m. on Thursday December 17 in the Amphitheater of the Peter Bent Brigham Hospital Dr William P Murphy Associate in Medicine Harvard Medical School and Senior Associate in Medicine Peter Bent Brigham Hospital will give a medical clinic To it are cordially invited practitioners and medical students

The clinics for December 24 and 31 will be omitted owing to the holidays The next clinic will be given by Dr Christian on January 7

### WORCESTER CLINIC FOR CRIPPLED CHILDREN

Under the Social Security Act Massachusetts has organized Services for Crippled Children to be administered by the Department of Public Health These services will be conducted in close cooperation with the Massachusetts Medical Society the

matter has already been brought before the President and Secretary of your District Medical Society

It is proposed to hold the first clinic in Worcester in the near future. Physicians of the Worcester District Medical Society are requested to make application to the Department of Public Health at the State House for such services for any crippled children under the age of 21 years, who are unable to pay for necessary medical and surgical care or for apparatus. A committee consisting of the following members has been designated by the President of the Worcester District Medical Society to pass on the eligibility of patients for such care: Dr. Ralph S. Perkins, Worcester; Dr. James A. Givan, Worcester; Dr. Joseph P. Mulhern, Worcester; Dr. Charles V. King, Worcester; Dr. Gilman V. Chase, Clinton; Dr. Alvin R. Moses, Charlton; Dr. John W. O'Meara, Worcester; Dr. Charles E. Ayers, Worcester; Dr. John B. Kelley, Worcester; Dr. Leslie R. Bragg, Webster; Dr. John V. Gallagher, Milford; Dr. Kent T. Royal, North Brookfield.

Dr. Paul Wakefield, Supervisor of Clinics for Crippled Children, will consult the above named committee and will be in Worcester several days before the clinic is held, and can be located through Dr. John W. O'Meara, the Orthopedic Consultant of this clinic. Dr. Wakefield will be glad to confer with you on any question that occurs to you.

"Crippled children" is defined as follows:

"For administrative purposes, the term 'crippled children' is understood to include those children under 21 years of age who are suffering from poliomyelitis, bone and joint tuberculosis, congenital defects, cardiac conditions, arthritis, and such other similar conditions as may lead to or have produced crippling, and which may be treated advantageously. It is planned to include children under the age of 21 years who require plastic operations following burns, accidents, congenital defects such as hare-lip, cleft palate, and so forth. It is not planned to include the care of children who are the victims of 'acute' accidents, or who require operations for hernia, or for the removal of tonsils and adenoids, nor is it planned to provide custodial care for children of low mentality or for other children."

Attention is also invited to the fact that it is now possible to admit to the Lakeville State Sanatorium patients of all ages, who are crippled as a result of poliomyelitis.—*Excerpts of a letter from Henry D. Chadwick, M.D., Commissioner of Public Health*

#### ANNOUNCEMENT

LESLIE H. VAN RAALTE, M.D., announces the opening of an office at the Munroe Building, 1245 Hancock Street, Quincy, Mass.

### REPORTS AND NOTICES OF MEETINGS

#### WILLIAM HARVEY SOCIETY

The William Harvey Society of the Tufts College Medical School met on November 6, 1936, in the

Auditorium of the Beth Israel Hospital, Dr. James J. Hepburn presiding. Dr. Allen O. Whipple, Professor of Surgery in Columbia University, spoke on the subject "Recent Advances in Surgery of the Pancreas." Dr. Whipple pointed out that, until within the last five years surgery of the pancreas had been limited to treatment of acute inflammation by incision and drainage, and to evacuation of cysts, which usually had to be marsupialized. Tumors were rarely attacked, due to fear of pancreatitis, duodenal leakage, or insufficiency of the gland. During the years 1930 to 1936, Dr. Whipple has surgically treated 91 cases of pancreatic disease of the following types:

Diseases	No of cases
Acute pancreatitis.....	19
Chronic pancreatitis.....	10
Cysts of the pancreas.....	7
Dermoid cysts of pancreatic region.....	2
Cystadenomas of the pancreas.....	4
Islet adenomas with hyperinsulinism.....	6
Diffuse islet hypertrophy.....	1
Sarcoma of the pancreas.....	1
Carcinoma of the pancreas.....	34
Carcinoma of the papilla of Vater.....	5
Carcinoma of the duodenum.....	2

Acute pancreatitis was first completely described by Dr. Reginald H. Fitz in the *Boston Medical and Surgical Journal* in 1889. Little has been added to our knowledge of the pathology of the condition since his observations. Tissue destruction is due to the proteolytic action of activated trypsinogen in the pancreatic secretions. The trypsinogen may be activated by the regurgitation of bile into the pancreatic ducts, or by the ferments liberated by broken down leucocytes, or ischemic pancreatic tissue. The toxemia of acute pancreatitis resembles the symptoms often observed in high obstruction of the gastrointestinal tract or in severe burns. There is a marked disturbance of the electrolyte and fluid balance of the body, and it is believed by Dr. Whipple and his coworkers that the symptoms may be due to an increase in the amount of potassium in the blood. The belief that operation should be performed as soon as the diagnosis of acute pancreatitis has been made has been proved false. The low blood pressure, and circulatory collapse should be corrected by administration of intravenous saline and glucose transfusion, heat and morphine. After improvement in the clinical condition it is possible to tell whether the patient is suffering from an acute or subsiding process, and whether an operation is indicated. The treatment of acute pancreatitis by making multiple openings in the capsule is dangerous, since it injures more tissue, and may precipitate more difficulties. Dr. Whipple advocates removal of the free peritoneal fluid, and the placing of a drain near the involved portion of the pancreas without incision of the capsule. If there is an associated jaundice the gallbladder should also be drained.

The differential diagnosis of acute pancreatitis



and other upper abdominal conditions may be aided by determinations of the value of the serum amylase. In acute pancreatitis this value is found to be markedly elevated, probably because of edema of the periductal tissues and partial obstruction of the pancreatic ducts. In a series of 11 cases of acute pancreatitis observed by Dr Whipple, there was a high level of the serum amylase in 9 patients. He has found that the viscosimetric method of Thompson is the most satisfactory since it is subject to only two per cent error. The slow, chronic occlusion of the ducts occurring in tumors of the head of the pancreas causes very little rise in serum amylase levels due to atrophy of the pancreatic tissues.

Cysts of the pancreas may be divided into four main groups:

- (1) Retention cysts
- (2) Cysts associated with neoplastic diseases (e.g., cystadenoma)
- (3) Pseudocysts (developing after trauma)
- (4) Dermoid cysts situated behind the pancreas

The majority of cysts are closely adherent to the celiac axis and its branches. Only those lying in the tail of the pancreas can be removed completely and the larger the cyst the greater is the danger associated with its removal. Dr Whipple marsupializes these cysts to the anterior abdominal wall and places a Wangenstein drain in the cavity to keep it dry. Primary healing of the wound is obtained and good granulation tissue forms with the contraction of the cyst wall. The sutures are removed, and a sclerosing solution is instilled into the cavity. Such instillations must not be made until after the tenth postoperative day, and not more often than every other day. Six to 10 applications are sufficient to secure contraction of the cavity, and early closing of the wound. Dr Whipple emphasized the importance of using silk technic in these operations. Such technic demands complete asepsis, absolute hemostasis, the use of fine instruments and careful regard for primary union, conditions essential in surgery of the pancreas. Large bites of hemostats and catgut sutures lead to necrosis of tissue and activation of pancreatic ferments with resultant digestion of the catgut and severe hemorrhage.

Since 1929 when Graham removed the first islet adenoma with relief of the symptoms of hyperinsulinism there have been 19 cases of islet adenomas reported in the literature in which operative treatment was successful. Six of these cases were Dr Whipple's patients. Not all cases of hypoglycemia are due to pancreatic disease. Lesions of the pituitary and floor of the fourth ventricle and certain types of liver disease may produce a chronic lowering of blood sugar and must be considered in the differential diagnosis. An important diagnostic procedure is the injection of adrenalin. Mobilization of sugar will occur in cases of hyperinsulinism but not in cases of hypoglycemia due to other causes. Medical treatment of hyperinsulinism is only rarely successful and in cases failing to respond to such

treatment surgical intervention is indicated. Dr Whipple has found spinal anesthesia most satisfactory for such operations and he uses a transverse incision through both recti muscles. The gastrocolic omentum is incised, and the whole pancreas carefully inspected for adenomatous growths, which usually appear as purplish pink nodules, and occur most frequently in the tail of the pancreas. Search should be made for more than one such adenoma, since they are occasionally multiple. They are usually easily shelled out, and are covered by a firm capsule. If no adenoma is found, two-thirds of the pancreas should be resected. All silk technic must be used in all cases, and only those cases are drained in which resection is necessary. In the reported cases there have been no fatalities, and in all of the cases in which an adenoma was removed, the hypoglycemia was cured. Some of the cases developed hypoinsulinism following operation, and had to be treated with injections of insulin.

Operations for malignancy of the pancreas are extremely hazardous because of the dangers of pancreatitis and the poor condition of the patients at the time of operation. Removal of malignant growths of the pancreas or of the ampulla of Vater should be made in two stages. In the first stage a gastrojejunostomy and cholecystgastrostomy should be performed, and the common duct ligated. The second stage should be performed three weeks later, at which time a portion of the duodenum is excised together with a V shaped section of the pancreas including the tumor. The ends of the duodenum are inverted, and the cut edges of the pancreas are sutured together. The wound is closed with drainage. All of the four cases treated in this manner survived the operation, but have suffered from cholangitis because of infection entering the biliary system through the cholecystgastrostomy. Dr Whipple hopes to eliminate this drawback in future operations by modifications of the gastrojejunostomy and cholecystgastrostomy.

#### GREATER BOSTON MEDICAL SOCIETY

The first meeting of the Greater Boston Medical Society for the current year was held at the Beth Israel Hospital Auditorium on November 10, 1936. The paper of the evening was presented by Dr I. M. Rabinowitch, Assistant Professor of Medicine and Lecturer in Pathological Chemistry in McGill University Medical School on the subject 'Effects of Protamine-Zinc Insulin and Other Mixtures of Zinc and Insulin in Diabetes Mellitus'.

During the past eleven years numerous unsuccessful attempts have been made to retard the rapidity of the action of insulin by combining it with certain metals. Recently Hagedorn has succeeded in retarding the rate of absorption of subcutaneously injected insulin by uniting it with protamine. The prolonged action of protamine insulin is not entirely accounted for by the delay in absorption, however.

In 1934 Scott found that pure insulin practically

always contained zinc when crystallized. If zinc were added to insulin the action of the latter was found to be prolonged and with excessively large amounts of zinc the activity of insulin can be almost completely blocked. Zinc has been found to form a very complex compound with insulin and protamine and by means of spectrographic methods it has been possible to determine the exact amount of zinc present in such molecules. All commercial preparations of insulin have been found to contain a certain amount of zinc, varying in amount from 0.626 to 1.15 mg per 500 units.

Dr Rabinowitch has used an insulin preparation containing 1 mg of zinc per 500 units and the patients studied have been on a high carbohydrate—low calorie diet. The preparation used is very stable and has retained its full potency for a period of nine months even when kept at room temperature. Use of crystalline zinc insulin caused the blood sugar of diabetics to be maintained at normal low levels for a length of time comparable to that obtained by use of protamine insulin. Protamine-zinc insulin maintained low blood sugar levels for a much longer time than either of these preparations; however, patients on the ladder diet required a smaller dosage of protamine-zinc insulin to maintain a normal blood sugar than those placed on the routine high carbohydrate—low calorie diet immediately and the time required for diet and insulin regulation in the former group was only half that required for the latter. Of all the cases treated with protamine zinc insulin none have experienced insulin reactions, a fact which may be explained by the ability of the body to liberate glucose into the blood by means of the adrenal mechanism more rapidly than it can be depleted by the slowly acting insulin compound.

The appearance of transient glycosuria in an apparently well controlled diabetic should not be considered an indication for increase in insulin dosage since glycosuria continues for several hours after the blood sugar has risen above the renal threshold even though there is immediate fall of blood sugar to normal levels.

Using protamine zinc insulin Dr Rabinowitch has been able to reduce the number of injections to but one per day, and the dosage required is smaller than that required for pure insulin. Of 133 cases of diabetes mellitus receiving therapy with this new preparation there have been only six failures, all in patients in whom therapy with other insulin preparations was also a failure.

Following the conclusion of Dr Rabinowitch's paper the meeting was opened for discussion. Several physicians told of the success with which they had used protamine zinc insulin and protamine insulin.

#### MASSACHUSETTS GENERAL HOSPITAL

A Clinical Meeting of the Staff of the Massachusetts General Hospital will be held in the Moseley Memorial Building on Thursday, December 17, 1936 at 8:15 p.m.

#### PROGRAM

- 1 Case Presentations
- 2 Differential Diagnosis of Lung Tumors—Donald S. King, M.D.
- 3 Surgical Treatment of Lung Tumors—E. D. Churchill, M.D.

There will be an exhibit before and after the meeting that will end promptly at 10 p.m.

Physicians, medical students, nurses and social workers are cordially invited.

Committee on Hospital Meetings

GRANTLEY W. TAYLOR, M.D. *Chairman*,  
EARLE M. CHAPMAN, M.D. *Secretary*

#### NEW ENGLAND PHYSICAL THERAPY SOCIETY

The regular meeting of the New England Physical Therapy Society will be held at the Hotel Victoria, 271 Dartmouth Street, Boston, on Wednesday evening, December 16, 1936 at 8 p.m.

Prior to the program there will be a meeting of the Council at 6 p.m. followed by a Round Table Dinner at 6:30 p.m.

#### PROGRAM

The Intensity of the Solar Radiation—Leslie Lyle Campbell, Ph.D., Cambridge Mass., Professor of Physics, Simmons College.  
Cell Response to Physical Measures—George E. Percy, M.D., Salem Mass.  
Question Period

All members of the medical profession are cordially invited to attend.

WILLIAM D. MCFEE, M.D., *Secretary*

41 Bay State Road, Boston Mass.

#### TUFTS COLLEGE MEDICAL ALUMNI CLUB OF WORCESTER COUNTY

There will be a meeting of the Tufts College Medical Alumni Club, Wednesday evening, December 16 at the Worcester City Hospital (Thayer Hall Nurses Home). At 6:30 p.m. dinner will be served for which a charge of \$1.50 will be made.

The Scientific Program is scheduled for 7:30 p.m. Dr. Siegfried Thannhauser, Associate Professor of Medicine, Tufts College Medical School, will present a Clinical Presentation and Discussion of Ward Cases from the City Hospital.

Dr. Thannhauser was Instructor of Internal Medicine at the University of Munich in 1917. He served at Muller Clinic, Munich for 14 years, has been Professor of Medicine and Physician in Chief, University of Heidelberg. Professor of Medicine and Physician in Chief at the Medical Academy in Dusseldorf and Professor of Medicine and Chief of Clinic at the University of Freiburg.

Since 1935 Dr. Thannhauser has been associated with the Boston Dispensary.

F. WASHINGTON, M.D. *President*  
N. S. SCARCELLO, M.D. *Secretary*

# NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

The three hundredth and thirteenth meeting of the New England Ophthalmological Society will be held on Tuesday December 15, 1936 at the Massachusetts Eye and Ear Infirmary 243 Charles Street, Boston

The Clinical Pathologic Conference is scheduled for 4 15 p m., the subject being Sympathetic Ophthalmia (1) Clinical Cases, (2) Review of Literature (3) Pathological Slides

At 8 00 p m. there will be a demonstration of new instruments as follows Modified Souter Tonometer by Dr J J Regan New Needle Holder by Dr F H. Verhoeff Irrigation Speculum, by Dr W B Lancaster, and LaCarrere Diathermy Needle by Dr E B Dunphy

An address entitled 'Ocular Allergy' will be delivered by Dr Albert D Ruedemann of Cleveland Ohio Discussion will then be opened by Dr Francis M Rackemann of Boston

## BOSTON SOCIETY FOR THE ADVANCEMENT OF GASTROENTEROLOGY

There will be a meeting of this society in the Cheever Amphitheater Boston City Hospital January 15 1937 12 00 m 1 00 p m

Dr P E Truesdale will speak on Gastro-Enterostomy as It Has Been Practiced for the Last Twenty Five Years

Physicians and medical students are invited to attend

LESTER R WHITAKER, M D *Secretary Treasurer*  
41 Bay State Road  
Boston Massachusetts

## NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held at the Boston City Hospital in the Amphitheater of the Mallory Institute of Pathology on Monday December 14 1936 at 8 15 p m

### PROGRAM

1 Demonstration of Specimens in Relation to Symptoms A. Subaortic Stenosis B Cardiac Perforation from Solitary Abscess Dr Soma Weiss

2 Circulatory Effects of Nitroglycerine Dr James G M Hamilton

3 The Effect of Thrombophlebitis on the Venous Valve Drs Edward A Edwards and Jesse E. Edwards

4 The Relation of the Nutritional Deficiencies to the Cardiovascular System

A. The Relation of Vitamin C to Rheumatic Fever Dr James M Faulkner

B The Clinical Features and the Characteristics of the Disturbance of the Heart and of the Circulation in Nutritional Deficiencies Dr Robert W Wilkins.

C Vitamin B<sub>1</sub> Deficiency and the Heart in the Rat Drs Paul M Zoll and Florence W Haynes

D Structural Characteristics of the Heart in Deficiencies, and Therapy Dr Soma Weiss

All members of the New England Heart Association and interested physicians are invited to attend

JAMES M FAULKNER, M.D., *Secretary*

## BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

The next meeting of the Society will be held at the Boston Medical Library on Thursday evening December 17 1936, at 8 15 o'clock.

### PROGRAM

Contributions to the Mind Body Problem

1 Introduction

Dr Frank Fremont Smith.

2 Environmental Stress as a Precipitating Factor in Rheumatoid Arthritis

Dr Walter Bauer (by invitation), Dr Stanley Cobb and Dr Isabel Whiting (by invitation)

3 Report of a Patient with Hysteria

Dr Mandel E. Cohen (by invitation) Dr Frederick S Coombs (by invitation) and Dr John H. Talbott (by invitation)

I Studies on a Patient with Hysteria.

Dr Mandel E. Cohen

II The Acid Base Balance of the Blood in Hysterical Hyperventilation

Dr John H. Talbott

H. HUSTON MERRITT *Secretary*

Boston City Hospital

Boston, Massachusetts

December 4 1936

## BOSTON MEDICAL HISTORY CLUB

8 Fenway

Monday December 21 1936 at 8 15 p m.

At the Boston Medical Library

The Many Sided Galen Fred B Lund, M.D

'Guy Patin — A Sixteenth Century Parisian Physician. Merrill Moore M.D

BENJAMIN SPECTOR M.D., *Secretary*

## SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY DECEMBER 14 1936

Monday, December 14—

\*8 15 p m. New England Heart Association Boston City Hospital, Amphitheater of the Mallory Institute of Pathology

Tuesday December 15—

\*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston. Blood Clinic Dr William Dameshek.

9 30 a. m. Massachusetts General Hospital. Thoracic Clinic Ether Dome

\*12 m South End Medical Club Office of the Boston Tuberculosis Association 354 Columbus Avenue Boston.

4 15 p m. New England Ophthalmological Society Clinical-Pathologic Conference Massachusetts Eye and Ear Infirmary 243 Charles Street Boston

- 8 p m New England Ophthalmological Society  
Demonstration of New Instruments Massachusetts  
Eye and Ear Infirmary, 243 Charles Street  
Boston

### Wednesday, December 16—

- 8 a m Massachusetts General Hospital Grand  
Rounds—Orthopedic Department  
\*9 a m - 10 a m Boston Dispensary 25 Bennet  
Street Boston Hospital Case Presentation Dr  
S J Thannhauser  
112 m Clinical-Pathologic Conference Children's  
Hospital Amphitheater  
4 p m - 5 p m Surgical Pathological Conference,  
Dr Cutler and Dr Wolbach Peter Bent Brigham  
Hospital.  
\*6 p m Massachusetts Institute of Technology De-  
partment of Biology and Public Health Delta  
Omega Lecture Room 10-250  
\*8 p m New England Physical Therapy Society  
Hotel Victoria 271 Dartmouth Street Boston  
\*8 15 p m Boston City Hospital Ophthalmic Ser-  
vice Henry Willard Williams Memorial Lecture  
Cheever Amphitheater

### Thursday, December 17—

- 8 a m Massachusetts General Hospital Circula-  
tory Clinic Rounds  
\*8 30 - 9 30 a m Exchange visit Surgical and Ortho-  
pedic Staffs of the Peter Bent Brigham and the  
Children's Hospitals held this week at The Chil-  
dren's Hospital  
\*9 a m - 10 a m Boston Dispensary 25 Bennet  
Street, Boston Social Service Case Presentation  
Miss E R Canterbury  
11 a m Massachusetts General Hospital Medical  
Grand Rounds—Ether Dome  
12 m Massachusetts General Hospital Clinical-  
Pathologic Conference  
\*3 30 p m Medical Clinic Peter Bent Brigham Hos-  
pital Dr William P Murphy  
\*8 15 p m Massachusetts General Hospital Clinical  
Meeting of the Staff Moseley Memorial Build-  
ing  
8 15 p m Boston Society of Psychiatry and Neuro-  
logy Boston Medical Library

### Friday, December 18—

- \*9 a m - 10 a m Boston Dispensary 25 Bennet  
Street Boston Body Fluid Loss and Repair Dr  
Allan M Butler  
12 m Massachusetts General Hospital Urological  
Conference Out-patient Department

### Saturday, December 19—

- \*9 a m - 10 a m Boston Dispensary 25 Bennet  
Street Boston Hospital Case Presentation Dr  
S J Thannhauser  
\*10 a m - 12 m Staff Rounds at the Peter Bent  
Brigham Hospital Conducted by Dr Henry A  
Christian

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

- December 10—Pentucket Association of Physicians Ho-  
tel Bartlett 95 Main Street, Haverhill at 8 30 p m  
December 11—William Harvey Society Auditorium of  
the Beth Israel Hospital Boston 8 p m  
December 11—Massachusetts Memorial Hospitals Lun-  
cheon Meeting of Surgical Section See page 1141  
December 14—New England Heart Association See  
page 1145  
December 15—New England Ophthalmological Society  
See page 1145  
December 15—Massachusetts Eye and Ear Infirmary  
Monthly Clinico-Pathological Conference See page 949  
issue of November 12  
December 15—South End Medical Club Office of the  
Boston Tuberculosis Association 554 Columbus Avenue  
Boston at 12 noon  
December 16—Massachusetts Institute of Technology  
Department of Biology and Public Health Delta Omega  
Lecture See page 1141  
December 16—Boston City Hospital Ophthalmic Ser-  
vice Henry Willard Williams Memorial Lecture See  
page 1141  
December 16—Tufts College Medical Alumni Club of  
Worcester County See page 1144  
December 16—New England Physical Therapy Society  
See page 1144  
December 17—Medical Clinic at the Peter Bent Brigham  
Hospital. See page 1141  
December 17—Massachusetts General Hospital Clinical  
Meeting of the Staff See page 1144  
December 17—Boston Society of Psychiatry and Neuro-  
logy See page 1145  
December 21—Boston Medical History Club See page  
1145  
January 10 - March 21, 1937—Sunday Afternoon Lectures  
at the Harvard Medical School See page 1141  
January 15, 1937—Boston Society for the Advancement  
of Gastroenterology See page 1145

February 25, 26 27, 1937—The New England Hospital  
Association Hotel Statler Boston  
March 30 April 2, 1937—First International Conference  
on Fever Therapy Postponement notice See page 5\*  
Issue of July 2  
April 21 24 1937—American Society for Experimental  
Pathology See page 1075 issue of May 21  
October 25 29, 1937—American College of Surgeons Chi-  
cago, Illinois

## DISTRICT MEDICAL SOCIETIES

### FRANKLIN DISTRICT MEDICAL SOCIETY

Will meet at the Weldon in Greenfield at 11 a m the  
second Tuesdays of January, March and May

CHARLES MOLINE, M.D. Secretary

Sunderland

### MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

January 13, 1937—Bear Hill Golf Club Stoneham

March 16, 1937—Danvers State Hospital, Danvers

May 11, 1937—Bear Hill Golf Club, Stoneham

KENNETH L MACLACHLAN M.D., Secretary

1 Bellevue Avenue, Melrose

### NORFOLK DISTRICT MEDICAL SOCIETY

January 19, 1937—8 15 p m The Peter Bent Brigham  
Hospital Communications and Case Presentations by the  
Staff Suggested title—'Abdominal Pain from the Medi-  
cal and Surgical Standpoint. Details of program to be  
announced

February 23, 1937—Time, place and details of program  
to be announced

March 30, 1937—8 15 p m New England Deaconess  
Hospital. A Symposium on Diabetes entitled 'A Survey  
of the Diabetic Work of the George F Baker Clinic  
in the New England Deaconess Hospital.' Communica-  
tions and Case Presentations by the Staff. Drs Elliott P  
Joslin Howard F Root, Priscilla White, Alexander Marble  
and Allen P Joslin

May, 1937—Annual Meeting Details to be announced.

Note The Censors will meet for the examination of  
candidates on the first Thursday of May 1937 Fee of  
\$10 00 is payable at the time of examination Application  
blanks may be obtained by writing the Secretary, fur-  
nishing name, address and name of school of graduation  
in medicine Application must be made at least three  
weeks prior to date of examination. Candidates whose  
applications are on file will receive proper notices

FRANK S CRUICKSHANK, M.D., Secretary

1247 Beacon Street Brookline

### PLYMOUTH DISTRICT MEDICAL SOCIETY

January 21, 1937—11 a m Bridgewater State Farm

March 18, 1937—11 a m Brockton Hospital

April 15, 1937—Annual Meeting 11 a m. Duce Hos-  
pital

May 20, 1937—11 a m Lakeville State Sanatorium

FRED F WEINER, M.D., Secretary

231 Main Street Brockton

### SUFFOLK DISTRICT MEDICAL SOCIETY

January 27, 1937—Boston Medical Library 8 15 p m  
Joint Meeting with the Boston Medical Library "Anthro-  
pology" Dr Carleton S Coon

March 31, 1937—Boston Medical Library 8 15 p m.  
'Social Insurance—It Affects the Medical Profession.'  
Dr Charles E Mongan. Discussion Dr Channing Froth-  
ingham

April 28, 1937—Annual Meeting Boston Medical Library  
8 15 p m Problems in Surgical Diagnosis Dr How-  
ard M Clute

CONRAD WESSELHOEFT M.D. President

CHARLES C LUND M.D. Secretary

### WORCESTER DISTRICT MEDICAL SOCIETY

January 13, 1937—Worcester City Hospital Worcester,  
Mass 6 15 p m Dinner—complimentary by the hospital.  
7 30 p m Business session and scientific program

February 10, 1937—Worcester State Hospital Worcester  
Mass. 6 15 p m Dinner—complimentary by the hospital  
7 30 p m Business session and scientific program

March 10, 1937—The Memorial Hospital Worcester  
Mass. 6 15 p m Dinner—complimentary by the hospital.  
7 30 p m Business session and scientific program

April 14, 1937—Worcester Hahnemann Hospital Worces-  
ter, Mass 6 15 p m Dinner—complimentary by the  
hospital. 7 30 p m. Business session and scientific pro-  
gram

May 6, 1937—At 4 30 in the rooms of the Worcester  
Medical Library Inc. at 34 Elm Street, Worcester, will  
be held the spring meeting of the Board of Censors

Wednesday Afternoon and Evening, May 12, 1937—An-  
nual Meeting Time and place for this meeting will be  
announced in an early spring issue of the Journal.

ERWIN C MILLER M.D. Secretary

27 Elm Street Worcester

# The New England Journal of Medicine

VOLUME 215

DECEMBER 17, 1936

NUMBER 25

## SYMPOSIUM ON NUTRITION AND THE DEFICIENCY DISEASES

Held at the Tercentenary Session of the Harvard Medical School  
on September 14, 1936

### HARVARD AND NUTRITION\*

CHAIRMAN'S ADDRESS

BY GEORGE R. MINOT, M.D.†

AMONG John Harvard's books was a copy of "Directions for Health," by Sir William Vaughan that passed through many editions. This treatise gives directions as to diet, so that the Harvard authorities may well have been acquainted with this problem from the early days of the college. Certainly, within the second academic year, they must have sensed the importance of proper food for their students. Although the wife of the first "professor" Nathaniel Eaton, was responsible for the students' fare, the magistrates of the court learned she often gave them only porridge and pudding, never beef, and the bread was sometimes "made of heated sour meal." Harvard's first "dietitian", however, branded as calumny the further assertion that their mackerel were cooked ungutted and that there was "goat's dung in their hasty pudding." It is still true today that good food may be spoiled by a poor cook. This state of affairs was soon corrected, but in those early days "short commons" were heard of from time to time. Indeed Nathaniel Mather, writing from England, asked, "Hath the meagrenesse of their winter commons shrunk up their guts and made their brames to perish, that they have quite forgotten us?" Although such remarks may suggest the occurrence of dietary deficiency disease, there is ample evidence that by and large the colonists had good food. Edward Johnson, in his "Wonder Working Providence", wrote in 1654, "The poor wilderness hath not onely equalized England in food but goes beyond in some places."

From antiquity until modern days, disease was considered largely due to some positive injurious agent. Concepts of diet chiefly concerned what foods were harmful. To diet meant "to be deprived in large measure of the pleasures of the table." Today we know that the lack of substances is an important cause for

ill health. There are of course harmful effects from excess of food, but the underfed and misfed, owing to a deficit in one or more aspect of the diet, create far more important problems. The major problems of nutrition concern supplying a diet optimal in multiple factors for each given individual at each stage of life. The energy requirements of the body must be met as well as many other specific requirements. The addition of vitamins and minerals does not replace calories. Quality, although of fundamental importance, cannot be substituted for quantity. The desire to be a slim young lady may lead to emaciation but not necessarily a dietary deficiency disease.

The science of the physiology of metabolism was founded by Sanctorius, who died the year Harvard College was founded. The names of Lavoisier, von Voit, Rubner, Atwater and Lusk are among many others intimately associated with the development of knowledge of metabolism and nutrition. Studies on nutrition at Harvard were few during the 150 years when these men made fundamental observations. J. C. Warren, James Jackson and Jacob Bigelow recognized the importance of diet for health, and Warren has been considered to have "made a science of the regulation of food." But the emphasis of these men was on overeating, although Jackson gave consideration to the quality of food. Henry P. Bowditch first established the correct curve for growth of man, and this was further studied by W. T. Porter. These studies and the extensive ones by Charles S. Minot on growth have a bearing on problems of nutrition. Rotch's contributions to infant nutrition, begun in 1887, were significant. He gave birth to the idea of individualization and variation and looked upon nutritional disturbances as being caused by certain elements of the diet rather than by diet as a whole. Rotch emphasized the necessity of thinking of food in terms of its components. Frederick C. Shattuck was one of the leaders in the recognition that the increased caloric requirements of typhoid fever patients must be met. A new wave

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of interest in metabolism began about 1908 when Benedict, at the Carnegie Nutrition Laboratory, described his new "unit respiration" apparatus. His work and that at Cornell of DuBois, a graduate of Harvard College, by means of clinical calorimetry have led to important advances. Joslin, at first with Benedict, has made extensive metabolic studies of diabetes, and Talbot, originally working with Benedict, has formulated the energy requirements of infants and children. The metabolic studies at Harvard concerning endocrine disorders are outstanding, being led by Means and Aub under the original stimulus of Edsall. Boothby of the Mayo Clinic also began his metabolic studies while working at the Peter Bent Brigham Hospital. During this twentieth century the contributions of Otto Folin to nitrogen metabolism and to the development of biochemical methods have done much to aid in the understanding of nutrition problems.

About 25 years ago was the dawn of the "newer knowledge of nutrition", when it became recognized that for health, in addition to protein a source of energy in the form of protein carbohydrate or fat, and a suitable supply of certain organic salts, it was also necessary to have a particular quality of protein and what are now called vitamins. More has been learned about the science of nutrition in the past quarter century than in any other period of the world's history. *Nutrition Abstracts* lists for the past year about 5000 articles on the subject. The development of knowledge has, however, not been entirely beneficial in its application, which is certainly unfortunate considering that about fifteen billion dollars a year are spent for food in the United States alone. The public's enthusiasm for vitamins and minerals illustrates well that "a little learning is a dangerous thing". No advantage to the public health has been gained by clever advertising emphasis on the infinitesimal amounts in which vitamins occur in ordinary foodstuffs and the exploitation of the "vitamin conscious" portion of the population with costly proprietary foods and remedies of uncertain vitamin content. The popularization of the relatively recent and constantly changing knowledge has also resulted in very little intelligent understanding of the facts.

In recent years there has been very significant work at Harvard concerning some of the modern aspects of nutrition, and you will hear shortly from some of the contributors themselves. Harvard was rather late in actively entering the vitamin field, and such names as Eijkman, Hopkins, Funk, McCollum, McCarrison and Mendel are not found on her roster. Yet Oliver Wendell Holmes in 1861 said, "I cannot help believing that medical curative treatment will by and by resolve itself in a

good measure into modifications of food swallowed. The effects of cod liver oil are only hints of what will be accomplished when we have learned to discover what organic elements are deficient or in excess in a case of chronic disease." Today the University has no man trained throughout life as a student of nutrition. There are here, however, diverse activities and potential opportunities to serve as a background for the further development of such studies which can have a far-reaching influence in many different fields. The mutual interaction of the laboratory and the ward will aid to solve problems of nutrition in relation to disease.

Nutrition intimately concerns the welfare of man, and his place in future history will depend in no small part on what he decides to eat. If the optimal, not usual, diet for man at all ages and under varying circumstances of his activity and environment were known and if, throughout generations, each person took an ideal diet—one nicely adjusted with respect to all its constituents at an optimum level for the best possible achievement—not only would much illness be prevented but the physical and mental development of man would be improved, leading to consequences of vast importance. Nutritional studies can wisely concern every phase of metabolism of organisms and their component cells. The effects of unsatisfactory nutrition play important roles in economic, educational, and sociologic problems, as well as induce disorders referable to every branch of medicine and dentistry. The effects of food on vitality, normal development, reproduction and longevity are fundamental and widespread, and there are multiple opportunities throughout the world for prevention of many sorts of disorders and of some unsocial states by better nutrition.

In the United States the essential food elements are abundant and easily procured. Individual low purchasing power plays some role in the production of faulty nutrition, but more often it is due to ignorance of the principles of good nutrition or to faddism. The physician must be scrupulously careful in prescribing diets, for example for diabetes or peptic ulcer, not to allow them to be deficient in any respect. Dietary deficiency may arise not only because of an improper intake of one or more substances required by the body, but also because established disease may prevent the formation, absorption and utilization or cause abnormal loss from the body of necessary substances. The effects of extra demands are always to be reckoned with. The physiologic strain of childbearing requires dietary factors to be from 10 to over 100 per cent greater than the standard requirements for women. Moreover, since the maternal diet in pregnancy and lactation inevitably affects the well being of the infant, the

health of the whole population depends to a greater or less extent on the nutrition of the mothers. With increased metabolism from exercise or other causes the demands for various essential substances such as vitamins B and C increase, while the requirement of minerals and vitamins is far greater during growth than in adult life. The influence of infection in decreasing the effectiveness of liver extract, iron, vitamin C and the like is now well recognized. The major problems of nutrition do not concern clear-cut deficiency diseases but the prevention of the occurrence of partial deficiency. Borderline states of nutritional instability are much more common than is usually appreciated. There is a wide zone between optimal nutrition and the level at which classic symptoms of recognized dietary deficient states develop. The undesirable influence of a faulty diet in the zone of partial deficiency may become detectable only after years or generations. Departure from an optimal diet, even if slight, may produce illness when operative over a long period of time, especially if combined with digestive disturbances or conditions inhibiting the utilization of substances derived from food. Such adverse factors as infection, chronic fatigue and arteriosclerosis can act to precipitate distinct dietary deficiency syndromes when a state of nutritional instability exists. Rapid improvement follows adequate treatment of deficiency disease but quick results in the health and longevity of a people are not to be expected through better diet.

The determination of the existence of a mild state of suboptimal nutrition is difficult. A carefully taken diet history may be of great value. Signs of improper development especially of the skeleton or anemia may be present. Symptoms may be absent or only vague such as a lack of sense of well-being. Rapidly increasing knowledge such as that concerning the chemical constitution of some of the vitamins is leading to procedures that aid us to determine if a deficiency exists.

The principle of treatment of deficient states consists in supplying the deficient substances on a quantitative basis. The outstanding signs of deficiency usually rapidly vanish when enough material enters the body to place the individual high in the zone of partial deficiency. The deficient state must be met in toto, for example, in pernicious anemia a certain amount of liver or stomach preparation is needed to

maintain a fairly satisfactory condition with over four million red blood cells, but it takes much more to meet all the individual's requirements. Today's knowledge does not permit us to prescribe with precision the amounts of the thirty-six or more substances which are required for correct nutrition. We must be guided by the general principles derived from the results of research and practical experience. To detect deficiencies and to remedy them piecemeal by supplements of manufactured concentrates will not at present solve the problem. Experience tells us that a mixed diet of natural food stuffs, one especially rich in milk, green vegetables, fruit, butter, eggs and food with ample protein of good biologic value gives the best results.

As one looks back to the time of the celebration of the two hundredth year of this University, we may say that essentially nothing was known about nutrition. We should probably shudder if we knew what our successors will say one hundred years hence about our meager knowledge of that subject. Yet we may take satisfaction in knowing that the foundations for then knowledge have been laid. It remains for us to seek diligently for more information in the laboratory and at the bedside. We may thus carry forward the work that the ultimate goal may be nearer for those who follow us.

CHARMAN MINOT. I have made no allusion to one very essential dietary constituent, namely, water. Its physiologic success has been critically considered by Professor Lawrence J. Henderson. Any marked departure from the normal content of body water gives rise to consequences which may prove serious. The minimal normal requirement for adult man is about 1500 gm. every twenty-four hours but this may be far too little to supply the demands in certain pathologic states. Upon the distribution of water in the body depends the translocation of other materials and to a certain extent this relationship is reciprocal. Thus upon the content of water in each tissue depends the continuation of the activity of that tissue. It is often convenient to look upon water of the body as occurring in several compartments. They are distinguished not only by location but by the particular electrolytes in solution. The major portion of body water is in the cells. The extracellular body fluids, one-quarter of which are in blood plasma, form about 20 per cent of the body weight. These fluids bring nutrient material to the tissue cells and carry away waste products of cell activity. They also provide a stability of certain physicochemical conditions within the organism which are fundamental for life. There are few men in this world as well fitted as Dr. James L. Gamble, Professor of Pediatrics, to discuss the importance of the Extracellular Fluid and Its Maintenance to our life and happiness.—

EXTRACELLULAR FLUID AND ITS MAINTENANCE\*

BY JAMES L GAMBLE, M D †

THE extracellular body fluids are the plasma of the blood and the interstitial fluid (including lymph) that lies between the vascular compartment and the tissue cells, as roughly shown by the diagram in figure 1 Extracellu-

It is therefore evident that the innumerable and interrelated chemical reactions that together accomplish what we call metabolism would rapidly fall out of adjustment, if these underlying conditions were not held at fairly constant values

The chemical anatomy of extracellular fluid is described by the two middle diagrams in figure 2 In these diagrams the relative values for

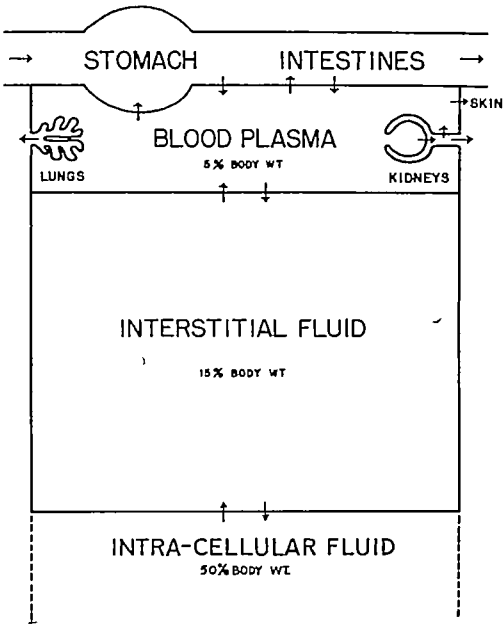


FIGURE 1  
International Clinics Vol 2 Series 46  
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lar fluid constitutes, as Claude Bernard appreciated, the immediate environment of the organism This aqueous medium which surrounds the tissue cells sustains two important services In the first place it conveys nutrient and waste materials With this transport function we have long been familiar The other service which extracellular fluid must provide, our knowledge of which we owe largely to Lawrence Henderson, is a stability of physicochemical conditions within the organism Prominent among these are reaction in terms of hydrogen ion concentration, osmotic pressure and temperature The values for these physical properties in cell fluid rest on the values at which they are held in the surrounding medium The necessity for nearly stationary values may be indicated by recalling that the rates at which processes of chemical change proceed are, in widely varying degree, affected by alterations in the accompanying physical circumstances

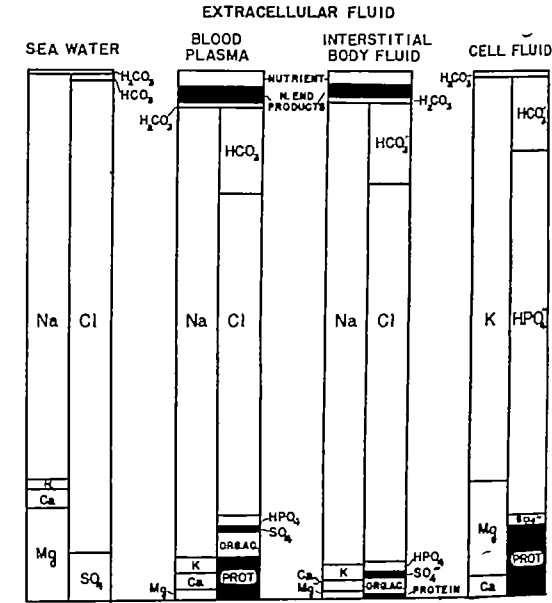


FIGURE 2  
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the concentrations of the chemical components of extracellular fluid are shown The values for the cations or potential base are superimposed in the left hand columns and those for the anions or acid radicals in the right hand columns The values for the nonelectrolytes, that is substances which do not dissociate into anions and cations, are shown across the diagram Except for the very much larger concentration of protein in the blood plasma, the chemical structure of the two extracellular fluids is, as may be seen in the diagrams, almost identical

As regards the history of extracellular fluid, the first diagram describes the chemical composition of the aqueous medium in which the earliest forms of life were successful The resemblance of the electrolyte pattern of sea water to that of extracellular fluid is very striking We find the same four components of the total base value, the same prominence of the concentrations of sodium and of chloride ion, and the same pair of buffering substances, free car-

\*An abbreviated presentation of material used in the following article by the author Extracellular Body Fluid International Clinics Vol 2 Series 46 Philadelphia J B Lippincott Co 1936  
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bionic acid and bicarbonate. In other words the chemical skeleton of sea water is clearly visible in extracellular fluid.

That extracellular fluid is a surrounding and not a pervading medium is shown by the widely different electrolyte pattern of cell fluid which is described by the last diagram in figure 2. Quite recently it has become fairly well established that the two most prominent factors of the chemical structure of extracellular fluid—sodium and chloride ion, are not permitted to pass the boundaries of protoplasm. That is, their position is exclusively extracellular. Ob-

### ILLUSTRATING ADJUSTABILITY OF PLASMA BICARBONATE

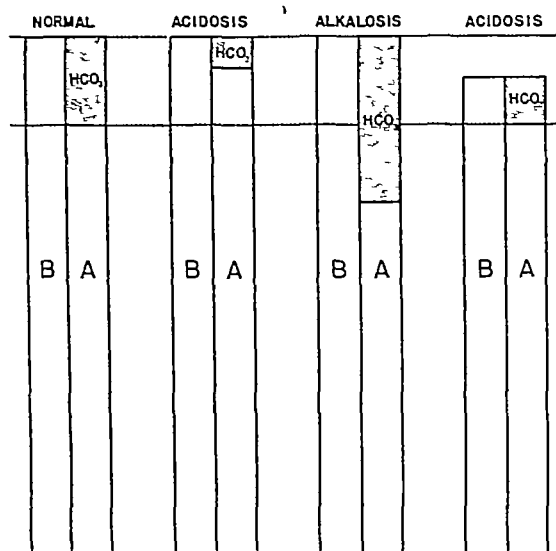


FIGURE 3

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viously this circumstance should facilitate accuracy of control of the quantities of sodium and chloride ion in extracellular fluid, a matter of importance since, as will presently appear, these two factors constitute a framework on the stability of which the necessary constancy of the physicochemical properties of extracellular fluid almost entirely depends. To turn for a moment to the concentration of bicarbonate ion ( $\text{HCO}_3$ ) which is a prominent part of the mechanism that defends body fluid reaction, this concentration of bicarbonate ion is constructed from that largest end product of metabolism, carbonic acid, to such extent as the concentration of total base stands above that of the other acid radicals. Owing to this mendicant position of the bicarbonate concentration, defects developing in other parts of the electrolyte structure cause a change in the bicarbonate value. This is illustrated by the diagrams in figure 3. In the second diagram the concentration of the other

acid radicals ( $\Delta$ ) is above its usual value with the result that the quantity of base available for the covering of bicarbonate ion is correspondingly reduced. In the next diagram is shown the reverse change which produces an extension of bicarbonate. In the last diagram a reduction of the total base value is seen to cause an equal reduction of the concentration of bicarbonate ion. Referring again to figure 2, it may be seen that the normal value for the bicarbonate ion concentration depends chiefly on an accurate control of the two large structural factors, sodium and chloride ion.

The osmotic value of extracellular fluid is, of course, determined by the sum of the concentrations of all of its chemical components. Here the concentration of sodium, owing to its large size and also to the adjustability of the bicarbonate ion concentration, plays an almost determining role. That is, the adjustable factor being on the acid side it follows that the total base value determines the height of the electrolyte structure or, in other words, the osmotic value of the electrolytes. The contribution of the nonelectrolytes to the total osmotic value is, as may be seen in the diagram, relatively small, and it is also seen that nearly all of the total base is sodium. We thus find that the osmotic value of extracellular fluid rests almost entirely on control of the concentration of sodium. Chloride ion, the other large skeletal factor, plays no direct part in determining the osmotic value because of the circumstance that a change in the concentration of chloride will be offset by a reciprocal change in the concentration of bicarbonate ion. We can readily see, however, that the concentration of chloride ion, by filling in the space between a suitable concentration of bicarbonate ion and the other relatively very small acid values, permits the concentration of sodium to a magnitude that enables it practically to determine the osmotic value.

We thus find surrounding the tissue cells a fluid of quite remarkable chemical ingenuity. Obviously this fluid is constructed from materials derived from the water and food intake. As regards control of these materials except for the concentration of free carbonic acid which is held at a fixed value by the respiratory mechanism and the concentration of protein which is established by a mechanism which is not yet visible, the chemical pattern of extracellular fluid is sustained by the kidney. The kidney is very inadequately described as an organ of excretion. Were the removal of waste products its only function, a much simpler organ would suffice. Its complexity of design and intricacy of function are required for the construction and accurate defense of extracellular fluid on the chemical constancy of which depends the successful operation of vital processes. Macal-

lum, regarding the establishment of the enclosed aqueous medium as the largest forward step in the history of the animal organism, has described the kidney as the organ *par excellence* of evolution

For the maintenance of extracellular fluid only three materials are directly required water, sodium and chloride ion. All of the other items of its chemical structure are provided by the processes of cell activity. This is not the case for sodium and chloride ion because of their extracellular position. Nor is the water of oxidation released by metabolic processes nearly sufficient to cover the expenditure of water in the removal of waste products in urine and in the dissipation of heat from the body by the vaporization of water. We can therefore understand why two special sensations were devised to insure an adequate maintenance of extracellular fluid—the sensation of thirst and a specific craving for sodium chloride. These considerations also enable us to understand the remarkable efficacy of an extremely simple therapeutic agent, physiologic salt solution, for repair of defects in the volume and structure of extracellular fluid.

CHAIRMAN MINOT Alterations in the extracellular body fluids may lead to edema. Decrease of colloid osmotic pressure exerted by the plasma proteins is an important factor in the accumulation of fluid in the tissues and serous sacs. The commonest method of depriving the body of protein is through a prolonged or excessive reduction of protein in the diet. In 1860 Bischoff and Voit noted that a bread diet led to a negative nitrogen balance and an increase in body water. It has been appreciated only recently, however, that there is a close connection between protein deficiency and edema, although the occurrence of dropsy with undernutrition has attracted attention for centuries. Like other deficiency diseases, nutritional edema has appeared in epidemic form under conditions which impose severe odds in man's struggle for existence and it has been described under such names as epidemic dropsy, war prison or famine edema and hunger swelling. Protein deficiency may inhibit growth and also cause symptoms, such as muscle weakness without the appearance of visible edema. Nutritional edema in a pure and marked form is rare but mild degrees are common in the course of other illnesses. Although nitrogen starvation is of prime importance there are many accessory factors which must be taken into consideration. This has been demonstrated in connection with edema following surgical operations especially by Dr. Chester M. Jones at the Massachusetts General Hospital who will now discuss Protein Deficiency.

## PROTEIN DEFICIENCY

BY CHESTER M. JONES, M.D.\*

DR. Minot has commented upon at least one of the causes of protein deficiency. He has also suggested that this deficiency, like most others, is to be observed only rarely in what might be called a pure state. I should like to amplify his remarks and to comment upon the symptoms due to protein depletion, the mechanism underlying them and their treatment.

An exact definition of protein deficiency is difficult but it is probably best described as one in which the deficiency is reflected in a lack of available protein in the plasma with a tendency to edema and serous effusions. There are several important causes—an insufficient protein intake, inadequate absorption of protein, an abnormally great loss of protein from the body, increased destruction of protein in the body and insufficient regeneration of protein. Protein depletion may develop acutely, but as a rule its manifestations are to be considered as the result of a chronic condition.

The simplest and the most obvious cause of protein lack is an insufficient intake.

In ordinary civil life there are two common causes. Extremely bad economic conditions in individual families may result in a limitation of meat and other nitrogenous food. A second cause and one that is extremely important, is

the presence of an underlying local or constitutional disease with marked anorexia resulting in a limitation of dietary protein. This is true in diseases of the digestive tract, especially if there is any degree of obstruction with vomiting, and is of particular importance inasmuch as the resulting food and protein lack may seriously complicate necessary surgical measures. In other words, the deficiency secondary to the fundamental condition may actually determine the success with which the underlying disease is handled.

Diseases such as diabetes, because of the inadequate utilization of food, are in a sense equivalent to a deficient food intake and are not infrequently associated with a protein deficiency, which, however, is almost always a part of a general dietary lack.

A somewhat less common cause is that of protein loss, which may be due to several pathologic conditions. Massive hemorrhage may provide an acute loss of plasma protein which the organism is unable to regenerate before the development of clinical symptoms. Obviously the hemorrhage must be of major proportions, and in addition there must be present an associated chronic disease that is the cause of the bleeding and that in itself retards the recovery from the sudden loss of plasma. Such an event may occur during the course of a bleeding ulcer.

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or in cirrhosis of the liver with bleeding from esophageal varices. Under such conditions massive hemorrhage may precipitate acute protein deficiency with its resulting clinical symptoms.

Chronic protein loss occurs typically in the nephrotic syndrome with its striking albuminuria. In extreme cases the plasma protein may reach a very low figure. To a lesser degree chronic protein lack may result from the other forms of renal insufficiency because of the associated albuminuria. Less common is the depletion seen in the later stages of cirrhosis. It is possible that in this type of liver disease as in many other degenerative conditions, there is a failure to form protein properly, but in the later stages of cirrhosis there is an appreciable loss of protein in the ascitic fluid. When the ascites recurs at a rapid rate so that frequent taps are necessary, the loss of albumin may reach proportions that are of real importance. A somewhat analogous situation occurs in the rather rare condition of adherent mediastinopericarditis with its mediastinal and portal venous stasis and resultant serous effusions. Obviously any chronic exudative disease that necessitates frequent tapping or drainage may serve as the basis for protein depletion.

Failure of absorption of protein can occur under varying circumstances. Obviously long-continued diarrhea due to such diseases as ulcerative colitis, tuberculous enteritis and the like, may result in a striking failure of absorption with consequent protein lack and low plasma protein values. Malignant disease of the lower intestinal tract occasionally may produce a diarrhea of sufficient severity to bring about a similar result. In sprue, pernicious anemia, beriberi and so forth absorptive processes may be inadequate because of the increased intestinal rate and also because of the changes in the intestinal mucosa. During relapses in these deficiency states it is becoming well recognized that striking mucosal alteration occurs which can seriously interfere with secretory and absorptive processes. Thus the immediate results of a specific deficiency state, such as pernicious anemia, may be the development of a further specific type of deficiency due to a malfunctioning digestive tract.

Abnormal protein destruction and diminished protein regeneration are undoubtedly operative in many cases of protein depletion, but such factors are difficult to evaluate. Obviously in severe febrile states, in which the processes of catabolism are increased and the food intake is decreased, minor degrees of protein lack may develop. With more chronic febrile disturbances such as occur in subacute bacterial endocarditis, pulmonary tuberculosis and the lymphomas there may well be a sufficient destruction of body protein to cause a real protein deficiency with its resultant clinical manifestations. In

such instances the factor of increased destruction is almost always coupled with an inadequate intake.

The regeneration of body protein is not at all clearly understood. Fibrinogen is known to be formed by the liver, but this protein constitutes only 3 to 6 per cent of the total plasma proteins and at present one can only speculate as to the origin of the other albumin and globulin components. It is probable that in the chronic degenerative diseases the processes concerned with the normal regeneration of body and plasma protein are interfered with sufficiently to contribute to a definite protein deficiency.

In the presence of serious protein lack certain clinical symptoms occur. Muscle wasting with its associated weakness is the obvious result of the loss of body protein from any of the causes already discussed. The lowering of the plasma protein is the direct result of the protein lack. It has been well established that the albumin fraction of the blood is the most rapidly depleted and the most slowly regenerated in cases of protein deficiency. Because the molecular size of the albumin components of the plasma proteins is definitely much less than that of the globulins, any striking diminution of the albumin content of the plasma results in a marked lowering of the osmotic pressure in the circulating blood, with an associated tendency to edema and serous effusion.

This tendency to form abnormal accumulations of water in the tissue spaces or in the serous cavities is characteristic of protein deficiency regardless of the underlying cause. As a rule the edema is subcutaneous and is to be noted only in the extremities. As such it is chiefly of importance as an indication of the severity of the underlying condition. Too frequently it is assumed that it is due to cardiac or renal failure and the true cause is overlooked. In addition to the peripheral edema one may observe somewhat less commonly an accumulation of fluid in the serous cavities. This may also occur in the absence of demonstrable edema. Serous effusions due to protein lack are usually to be noted in cases of nephrosis, cirrhosis of the liver, mediastinopericarditis and the like. A third location for the abnormal deposition of fluid exists but this is not commonly recognized. This is in the viscera themselves. Edema of the lungs is commonly attributed to cardiac failure. That it may occur as the result of protein lack or that such viscera as the heart or the intestine may also participate in an abnormal accumulation of water is less well known.

A few years ago experimental observations provided us with some very interesting data concerning such a phenomenon. In our experiments animals were subjected to varying degrees of pure protein starvation. Once the plasma protein

level had been definitely reduced, various maneuvers were carried out, such as the establishment of sterile drainage from the peritoneal cavity, the production of sterile subcutaneous abscesses and the performance of an entero-anastomosis. At the same time adequate or slightly excessive amounts of fluid in the form of normal salt solution were administered subcutaneously. By such means various postoperative situations were closely simulated. After varying periods of time, which were more or less dependent on the degree of protein starvation preceding the operative procedure, peripheral edema usually developed. Free fluid was noted frequently in the serous cavities. To us, however, one of the most interesting findings was the very striking increase in the water content of the viscera. We found as much as 10 per cent increase in the water content of the lungs, 5 per cent in the heart muscle and 7 per cent in the wall of the ileum. Such increases in the water content of the organs imply a marked change in tissue physiology, and it is hard to believe that such changes are consistent with normal function. It seems equally logical to suggest that such variations from the normal may frequently constitute the background for the so called "poor-risk" patient.

The development of nutritional edema is not dependent solely upon the actual level of the plasma protein or albumin. Even with extremely low values edema will not occur without a sufficient fluid intake. Limitation of fluid, due to an insufficient intake by mouth or other routes or by reason of excessive vomiting or diarrhea, may definitely influence the course of abnormal water accumulation in the body. In cases of advanced nephritis striking edema has been known to disappear during the period of vomiting associated with the development of uremia. In spite of a very low plasma protein, it was not possible to produce edema in our experiments, even in those animals in which depletion was extreme, unless the amount of fluid administered was somewhat in excess of the normal daily intake. Another variable of equal importance is the intake of sodium chloride. Limitation of this substance prevented or diminished the abnormal deposition of water in the tissues. The functional condition of the heart, kidneys and liver, the presence of sepsis and increased capillary permeability are all additional factors of importance, but, without question, the lowering of the plasma protein and albumin values constitutes the most important single factor affecting the development of the outstanding symptom of edema in cases of protein deficiency.

A brief presentation of two cases will best illustrate the phenomenon under discussion and will indicate how the condition may develop

under circumstances other than those of simple starvation.

The first case is that of a 62 year old man with a typical story of partially obstructing pyloric ulcer of fifteen years' duration. He entered the hospital because of vomiting. Examination showed loss of weight and edema of the legs, genitals and abdominal wall. The plasma protein was 5.7 per cent. With rest and careful feeding the edema disappeared, and a gastroenterostomy was performed. During the first week after the operation vomiting recurred, and at the end of this period edema developed rapidly. Oliguria was an associated finding, with the specific gravity of the urine reaching 1.034. On the tenth day a watery diarrhea developed, suggesting edema of the intestine, and two days later pulmonary edema was noted. He died the following day. The plasma protein one week after the operation was 4.5 per cent. Necropsy showed gross edema and fluid in the serous cavities. The malfunctioning of the gastroenterostomy was due to a striking edema of the walls of the jejunum and ileum, with partial obstruction of the site of operation due to the swelling.

This case is typical of protein deficiency due to the malnutrition accompanying gastrointestinal disease. The necessary surgical measures could but aggravate the existing protein lack, and the required fluid and salt that had to be administered postoperatively could hardly fail to cause edema with the existing low plasma protein. An almost unavoidable vicious circle was established, with the rapidly developing visceral edema completing the final picture of tissue failure.

The second case is an example of acute protein depletion. The patient, a man of 40 years, entered the hospital because of acute hemorrhage. There was a history of chronic alcoholism, with recent symptoms of anorexia and mild indigestion. Examination showed marked pallor, sweating and a rapid pulse. Light percussion revealed a definite increase in splenic dulness. The hemorrhage was of sufficient degree to give a red blood cell count of only 1,500,000 and a serum protein of 4.5 per cent. Subsequent x-ray examination showed esophageal varices. The particular point of interest was the sudden development of ascites and edema about a week after the bleeding had subsided. This was undoubtedly due to an acute protein deficiency, caused by the hemorrhage and aggravated by three other factors—the inability to take sufficient protein by mouth, the necessity of administering moderately large amounts of fluid by clysis and the inability of the liver to function normally in relation to the regeneration of plasma protein. With the gradual return of the blood to a more normal level the ascites and edema disappeared.

The treatment of protein deficiency depends upon the factors causing it. In general it can be said that in acute depletion, such as may occur after massive hemorrhage, the chief consideration is the early replacement of the lost plasma protein. This can be accomplished best by repeated, early blood transfusion. Protein feeding, because of the nature of the underlying disease, frequently has to be postponed until well into convalescence. The administration of minimal amounts of fluid and sodium chloride is essential.

For the protein deficiencies due to simple starvation, the providing of adequate amounts of protein in the diet is usually sufficient. Animal protein is the food of choice.

In those instances where an insufficient protein intake is due to an underlying obstructing disease, such as ulcer or carcinoma, successful treatment depends upon a direct attack upon the fundamental cause of the condition, usually by surgical procedures. In addition, preoperative and postoperative care of the patient by repeated transfusions, limitation of fluid and salt and occasionally emergency feeding by jejunostomy constitute the necessary measures for complete success. Recognition of the problem of protein deficiency in relation to the "poor risk" patient will go far to increase the success of surgical measures indicated in such cases.

If improper absorption is due to mucosal changes, secondary to a condition such as beriberi, the treatment of the primary deficiency usually results in the successful management of the symptoms due to protein lack.

When there is protein deficiency due to a chronic disease, such as nephritis, cirrhosis, and so forth, therapeutic measures must consist largely in the administration of slightly better than maintenance amounts of protein in the diet and limitation of salt and fluids. Diuretics may at times be of temporary assistance in controlling the existing edema, and of these the mercurial preparations are the best. They are chiefly useful in cases of cirrhosis with low plasma protein and recurrent ascites. Transfusions are of only temporary help, but at times are indicated, even in the chronic cases of protein de-

ficiency, in order to raise quickly the plasma albumin.

In summary, then, we can say that protein deficiency, acute or chronic, has as its causes (1) an insufficient intake of protein, (2) failure of absorption, (3) an increased loss of protein from the body or, possibly, increased destruction or failure of regeneration of protein. Treatment consists, obviously, in providing an adequate protein intake whenever possible, in the specific treatment of any other deficiencies which may, at the same time, interfere with the proper absorption of protein, in appropriate surgery with proper precautions in instances where inadequate intake or insufficient absorption is due to a lesion of the gastrointestinal tract, or in the more chronic cases in the use of transfusions and diuretics in order, at least temporarily, to alter plasma protein values. In all instances it is expedient to limit fluid and sodium chloride intake.

**CHAIRMAN MINOT:** Deficiency of protein plays but a small role in producing a deficit in the body of the compound protein, hemoglobin. The clinical study of deficiency of this substance resolves itself largely into a study of iron deficiency. It has been known that iron was a specific for the "green sickness", chlorosis, since before the days of Sydenham and that diet could affect the amount of iron in the blood, since Menghini in 1746 showed that it could be increased by feeding iron-containing foods. We are indebted to George H. Whipple for placing on a secure quantitative basis the influence of food on anemia. There remain however many mysteries about the metabolism of hemoglobin and iron. Certain facts have become clear and among them is the actuality that iron deficiency is a dominant factor in the production of hypochromic anemia which appears clinically under various names such as anemia of chronic blood loss, idiopathic hypochromic anemia and simple anemia of pregnancy. The last was included in Walter Channing's (our first Professor of Obstetrics) classic paper in 1842. These anemias that respond entirely satisfactorily to the oral administration of iron were included among the so-called secondary anemias in a less exacting medical era. Heath with Strauss and Castle was the first to demonstrate in hypochromic anemia that iron given by injection will be returned quantitatively as newly formed hemoglobin (10 milligrams of iron forming 3 grams of hemoglobin). Thus there is clear-cut evidence of direct participation of the deficient substance in the recovery following its administration. The Mechanism of Hemoglobin Deficiency will be presented by Dr. Clark W. Heath.

## MECHANISM OF HEMOGLOBIN DEFICIENCY\*

BY CLARK W. HEATH, M.D.

**F**OR the purpose of this discussion I wish to apply the term "hemoglobin deficiency" to that type of anemia in which the formation of

hemoglobin is particularly at fault, namely, hypochromic anemia.

Hemoglobin may be regarded as a protein in which a large molecule, globin, is linked with a smaller iron-containing molecule, heme. Under ordinary nutritional circumstances the body apparently is capable of furnishing on demand all the substances which go to make up

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the protein molecule, hemoglobin, with the frequent exception of iron. Even the pyrroles, which form an essential part of hematin, can apparently be manufactured in the body. But iron is, of course, an element that is unchanged and unchangeable and must be provided to the body from outside. Although it is extremely important to the body, it is not present in very generous amounts and is very easily exhausted, particularly when hemoglobin is lost by hemorrhage. When iron is given intramuscularly to cases of profound hypochromic anemia it can be recovered quantitatively in newly formed hemoglobin. This illustrates the peculiarly important place that iron has in the formation of hemoglobin. In the absence of a supply of iron, that is, in iron deficiency, hemoglobin cannot be manufactured.

Nevertheless, there are a number of substances that, in the presence of iron, have been shown to have an additive effect upon hemoglobin production. In Whipple's work will be found certain foodstuffs arranged according to their power of regenerating hemoglobin in dogs rendered chronically anemic by repeated bleeding and maintained on a diet poor in hemoglobin-regenerating factors. A particular liver extract, prepared by precipitating the aqueous extract with 70 per cent alcohol, has been shown to produce hemoglobin regeneration in these dogs. Bile pigment, chlorophyll and chlorophyll derivatives have been shown to be effective, when added to small doses of iron, in increasing blood regeneration in hypochromic anemia of man. Copper is apparently a necessary substance for hemoglobin formation, and this has been definitely proved in small animals. Although iron will be absorbed when given to anemic rats in the absence of copper, it will not be utilized to form hemoglobin until copper is added. Other metals, such as cobalt, nickel and manganese, perhaps have in very minute amounts, a similar influence to copper. The practical value of these substances in human hypochromic anemia is very doubtful. These substances, while aiding blood regeneration, do not seem necessarily to be supplying specific deficient factors of the hemoglobin molecule itself, but to be helping intermediate metabolic processes in the formation of hemoglobin. For example, the administration of suboptimal doses of iron in acid-buffered mixtures will cause greater blood production than in alkaline mixtures, probably by facilitating iron absorption in the small bowel.

In addition to the administration of these various substances that aid hemoglobin regeneration, there are innumerable factors that have important modifying effects. A certain healthy state of the body is necessary for the formation of hemoglobin and the maintenance of the nor-

mal hemoglobin concentration. Hemoglobin manufacture is a chemical process taking place continuously and is closely associated with other metabolic processes of the body. Thus, the absence of the thyroid secretion, deprivation of vitamin C and any diseased condition, such as chronic infection, nephritis or carcinomatosis, that interferes with metabolic processes of the body, including cellular function and formation in general, will interfere with hemoglobin formation. These various states frequently result in anemia, which may be hypochromic in nature and which signifies, therefore, an inhibition of the process of hemoglobin formation, though not on the basis of a deficiency of the essential components of hemoglobin. Unless these factors are adjusted properly, the administration of iron in cases of iron deficiency will fail.

A deficiency of iron in the body is common and, as noted, leads to hypochromic anemia. The anemia is, as a rule, quickly alleviated by giving inorganic salts of iron by mouth. Iron so given does not act as a so called "stimulant", but supplies a deficiency, for iron is ineffective in other types of anemia not associated with iron deficiency. How the deficiency of iron comes about is not clear in every case, but certain general rules can be formulated. The body is very sparing of iron. There is no definite evidence that a negative iron balance, that is a loss of iron from the body, can be produced by limiting the amount of iron in the diet. Although Sherman has stated that 15 milligrams per day is an optimum iron intake, diets containing much less iron will maintain the iron balance. This is true even though only a fraction of the iron in the food is available to the body. The amount of iron excreted in the urine is practically negligible. Therefore, there is a marked difference between the metabolism of iron and the metabolism, for example, of such elements as nitrogen or calcium, for a loss of nitrogen or calcium may very easily be produced by restricting these substances in the diet. One must search for a loss or an increased consumption of iron to explain in large part an iron deficiency.

There are a number of mechanisms active during different periods of life by which iron may be lost or exhausted. In growth there is a demand for iron to supply in particular the increasing mass of hemoglobin in the expanding blood volume and also to supply the needs for iron of the tissues of the body. In pregnancy there is a demand for iron by the fetus. In women there is a continual demand for iron due to the blood loss accompanying menstruation. These factors of iron consumption and loss must play a primary role in the causation of hypochromic anemia, dietary deficiency of iron or malabsorption of iron in a diseased gastrointestinal tract being of secondary impor-

tance This state of affairs is theoretically true in all dietary deficiency states First in importance is the loss or increased consumption of the deficient substance and, secondly, inadequate intake

The recognized types of iron deficiency anemia, some of which in the past have been regarded as of very obscure etiology are as follows hypochromic or nutritional anemia of infancy and childhood, chlorosis, "idiopathic" hypochromic anemia, hypochromic anemia of pregnancy and hypochromic anemia of blood loss

Iron deficiency occurs in childhood probably because of the excessive demand of growth inadequate iron endowment from the mother diets poor in iron (for example, an exclusive milk diet during the first year of life) and gastrointestinal disturbances that interfere with absorption It occurs in girls after puberty usually because of the combined demands for iron of growth and menstruation together with diets poor in iron The theoretical demand for iron in a year's time in a girl after puberty is approximately the same as the demand for iron of a normal pregnancy Chlorosis, although much less common than in the preceding century has not disappeared and, at least in mild form is undoubtedly very common Dr Arthur J Patek and I have observed in the past two years at least six cases of severe anemia in girls which seemed very typical of what could be called old-fashioned chlorosis In "idiopathic" hypochromic anemia, which usually occurs in middle aged women, careful clinical study of cases has shown almost without exception blood loss usually by menorrhagia or bleeding hemorrhoids occurring in a subtle and chronic form but some cases have had multiple and frequent pregnancies diets poor in iron or gastrointestinal disturbances, associated with achlorhydria, that interfere with absorption of iron The hypochromic anemia of pregnancy results from the demands of the fetus for iron, poor iron reserves, a diet poor in iron and malabsorption of iron The demand for iron when there is blood loss is obvious The effect of factors altering the internal metabolism of iron on the production of anemia requires study and is but one of many aspects of hemoglobin metabolism that remain to be solved

It seems desirable and important to group all of the various types of hypochromic anemia under the term *non deficiency* There is no question that these forms of anemia represent a deficiency disease Moreover, this is a deficiency disease in which the extent of the deficiency can be determined quantitatively at any time by the determination of the hemoglobin in the blood and in which the deficient factor, iron can be supplied quantitatively The various ways in which the deficiency arises are now fairly well understood We have, therefore, data concerning this deficiency disease which we have not as yet been able to obtain concerning those deficiency states in which the deficient factors are organic substances and the manner of activity is little understood If the clinician will bear in mind the fundamental causes of iron deficiency as seen in man will eliminate, if possible, causes of blood loss and will treat such cases by the administration of proper doses of iron, there will be a very large number of people, especially women, with much better health

Dr Heath illustrated his communication by several lantern slides

CHAIRMAN MINOT Modern knowledge of nutrition has in large part developed by means of studies on normal animals in which dietary deficiency disease is produced by the elimination of specific substances in the diet That deficiency disease in man may and frequently does develop because of some disturbance of the gastrointestinal tract in spite of an apparently adequate diet is of recent recognition Dietary deficiency itself may lead to defects of the stomach and intestines and thus a vicious cycle can arise

A totally new concept for the origin of a deficiency disease was demonstrated in 1928 when it was shown that Addisonian pernicious anemia arose because of an abnormality of gastric secretion Since then the knowledge of the relationship of the gastrointestinal tract to dietary deficiency disorders has advanced rapidly The man responsible for the ingenious hypothesis and beautiful demonstration of the role that a lack of a gastric factor on the one hand and a dietary factor on the other plays in the production of pernicious and related macrocytic anemias has justly received recognition for his work from different parts of the world and in various ways Dr Castle is to be congratulated on his epoch making contribution to clinical medicine and human physiology He will speak to us on The Relationship of Defective Nutrition to Changes in the Gastrointestinal Tract regarding which he constantly adds information

THE RELATIONSHIP OF DEFECTIVE NUTRITION TO  
CHANGES IN THE GASTROINTESTINAL TRACT\*

(ABSTRACT)

BY WILLIAM B CASTLE, M D †

AN important though obvious feature of nutrition is the fact that food, until it has left the alimentary tract, is still in a physiologic sense outside the body. The digestive tube is essential to the reduction of the raw materials of the food to the proper size and constitution for absorption. Failure of this normal function of the alimentary tract may thus "condition" a deficiency of water, salts or energy-producing material. Certain vitamin deficiency diseases are also apparently produced by gastrointestinal defects. Indeed, the function of the alimentary tract may be specifically concerned in the metabolism of an accessory factor in the food. For example, during the past decade, studies of the macrocytic anemias that respond to suitable liver extracts have disclosed a particular function of the normal stomach in respect to blood formation. Thus, a factor in the food normally becomes effective in the body as "liver extract" only after contact with a substance secreted by the stomach. Disturbances of the function of the alimentary tract, even of certain portions of it, may thus have a general or a subtly specific effect upon the nutrition of the individual. Once established, certain disturbances of the digestive tract may "condition" the individual for a dietary deficiency disorder even though he partakes of a diet completely adequate for normal man.

Digestive disturbances since the dawn of medical knowledge have been known to result from improper food. About fifteen years ago McCarrison in India showed that widespread changes of the alimentary tract in animals can

be produced by defective nutrition. It is now becoming recognized that defective diets may produce in man degenerative defects, at least of certain portions of the alimentary tract. Conditions associated with changes, temporary or permanent, in the tongue, stomach and intestines are apparently due in many instances to chronic dietary deficiency. They are clinically manifest in pernicious anemia, sprue, pellagra and in less well-defined conditions frequently seen in hospital and private practice. Thus an adequate diet is essential lest irreparable injury be done to the organ that conditions the raw material of the food before it is converted into the nutrient medium of the body.

CHAIRMAN MINOT. The history of scurvy forms a fascinating chapter in the history of the world and science. One should not neglect to enjoy the description by Jacques Cartier in 1536 of the cure of scurvy 'by drinking in six days a (spruce) tree twice as large as a French oak', nor should one fail to read the records of the *controlled* experiments in 1747 by James Lind showing that orange or lemon juice is a specific cure. It was not until about 1919 that scurvy was generally accepted as a deficiency disease due to the lack of a specific chemical substance. Only recently has vitamin C (cevitamic acid) been isolated and synthesized. The importance of characterizing the vitamin deficiencies pathologically was appreciated by Dr. Wolbach more than twelve years ago. He was the first to point out that repair phenomena during recovery from vitamin deficiency must be studied. Recently he has noted that we have in the study of vitamin deficiencies an opportunity, for the first time in the history of biology, to correlate intracellular chemistry and cellular morphology. Dr. Wolbach with Dr. Howe has made numerous important contributions to the pathology of vitamin deficiencies. Their most significant discovery is the characterization of scurvy as a disease in which the whole pathologic anatomy can be based on the consequences of the deficiency of intercellular material. 'Vitamin C and the Formation of Intercellular Material' will now be presented by the Shattuck Professor of Pathological Anatomy, Dr. Wolbach.

VITAMIN C AND THE FORMATION OF INTERCELLULAR  
MATERIAL

BY S. BURT WOLBACH, M D \*

THE name vitamin connotes a preformed substance necessary for some essential intracellular chemistry in the body. Because no one today has defined vitamins, it is pertinent to state that the substances so designated are all directly or indirectly of plant origin. They are not sources of energy and are not building ma-

terials as are fats, carbohydrates and proteins. Deprivation of a vitamin suppresses a physiologic process. The cells concerned may exhibit structural changes, but may survive and be capable of growth and multiplication. Such effects are easily demonstrable in epithelial cells in vitamin A deficiency, in cartilage cells in vitamin D deficiency and in all supporting tissue cells in vitamin C deficiency.

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Vitamin C deficiency, of all those studied, produces the most striking alteration in the body structures. Because its chemical structure and some possibilities of its function within cells are known, I take this occasion to present again the consequences of this deficiency, which affords the best promise of a complete solution of any of the vitamin deficiency phenomena—a solution of great importance for progress in the physiology and pathology of intercellular materials, notably the so-called degenerative diseases of blood vessels and joints and even the processes characteristic of old age.

Vitamin C (ascorbic or cevitamic acid) is necessary for the formation of all intercellular substances having collagen as their basis, and its absence prevents the formation of the matrices of white fibrous tissue, bone, cartilage and dentine. This explains all gross lesions of scurvy. The consequences of its absence are therefore most apparent in growing animals and in the repair of lesions of the above tissues. The deficiency does not prevent multiplication of the cells of each type of tissue, but the cells assume a common morphology, approximately that of embryonic connective tissue, and histologic appearances indicate that a liquid material is produced in lieu of the normal matrix. Administration of ascorbic acid by mouth or parenterally is promptly followed by the production of intercellular substances and by the resumption of cytology characteristic of the tissue concerned. This method of suspending and inducing collagen formation in growing animals and in experimentally created defects permits study of the sequence of formation and differentiation of intercellular materials and has definitely proved that collagen is a secretory product of the cell, in exclusion of several theories of its origin.

Extended studies of guinea pigs in absolute vitamin C deficiency and of others maintained for long periods on inadequate ascorbic acid rations have failed to reveal morphologic evidence of loss of function of epithelial tissues,

but have given evidence of a quantitative relationship between the amounts of vitamin C administered and the quantity of intercellular materials produced. Biochemists, in attempting to apply the properties of ascorbic acid to physiology essential for the organism, have failed to realize that there is at least one recoverable end product dependent upon its presence. Because cell division occurs in absolute vitamin C deficiency and, therefore, the continuation of synthesis of proteins, the speculations of a morphologist, irresistibly, though timidly, are along the lines of attributing to ascorbic acid a late role in the formation of collagen, possibly the polymerization of a simple molecule hazily in mind as something like gelatin or whatever the apparently liquid substance is that the mesenchymal cells produce in scurvy.

Dr Wolbach then demonstrated a number of lantern slides of tissue sections illustrating the pathologic effects of vitamin C deprivation.

CHAIRMAN MINOT. In my introductory remarks I alluded to the importance of detecting and correcting suboptimal nutrition. Deficiencies are relatively easily produced during growth, so one may expect to observe the effects of partial dietary deficiency more often in children than in adults. Disorders from improper food may appear to be slight, yet under such circumstances they may slowly lead to altered function and anatomic changes that permit organisms or other factors to be the more immediate cause of disease. There is no phase of medicine more essential than preventive pediatrics. The early correction of any nutritional defect in the child is of the utmost importance. Slightly improper nutrition during growth may cause defects many years later and a shortening of the span of life. The advances being made in different fields of medicine and biology are aiding to detect incipient deficiency states. Dr Blackfan with Dr Wolbach has contributed information concerning the early diagnosis of vitamin A deficiency. Histologic changes may develop in the tissues before external symptoms are obvious. Studies concerning the early recognition of vitamin deficiency are being actively pursued in various departments of the University. The Thomas Morgan Rotch Professor of Pediatrics, Dr Blackfan will now tell us of the progress of knowledge in this important field.

## PROGRESS IN THE EARLY RECOGNITION OF VITAMIN DEFICIENCY STATES\*

BY KENNETH D. BLACKFAN, M.D.

IN this consideration of the progress in the early recognition of vitamin deficiency states it would seem appropriate to recall the many milestones which have been passed since a number of clinicians<sup>1, 2, 3, 4, 5</sup> whose writings have become classic, clearly described the advanced clinical manifestations of rickets, scurvy, ber-

beri, xerophthalmia and pellagra. Attention was directed by these writers of medical history to the chief diagnostic features in each one of these diseases—namely, in rickets, to beading of the ribs and deformities of the limbs, in scurvy, to bleeding of the gums and painful extremities, in beriberi, to a paresis of the limbs and a tachycardia with terminal cardiac failure in xerophthalmia, as the name implies, to a peculiar dryness of the conjunctivae which led to blindness and which was associated with malnu-

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\*Blackfan, Kenneth D.—Thomas Morgan Rotch Professor of Pediatrics, Harvard University Medical School. For record and address of author see *This Week's Issue*, page 1152.

trition and stoppage of growth, and in pellagra, to a glove-like dermatitis of the hands, a red tongue and gastrointestinal disturbances. Therefore the late clinical manifestations of these disorders have been known for a long time.

Notwithstanding these contributions, the theories as to the etiology of these clinical entities were for many years wholly speculative. It was intoxication. It was infection. Many other fanciful suggestions were entertained. When it was finally agreed that the true nature of these disorders rested on a dietary basis, it became possible to prevent and cure them empirically. Nevertheless, the actual errors in the diet remained a mystery until new light on this subject was shed through experiments on small laboratory animals.

It has been said that Lunin<sup>6</sup> in 1881 first demonstrated that white mice would not thrive on a purified diet containing the "proximate principles" in milk. He thought the diet was so unpalatable and monotonous that the mice lost their appetite and inevitably died of malnutrition. The significance of this observation was not fully appreciated until Sir Frederick Gowland Hopkins<sup>7</sup> confirmed these experiments. His singular contribution was the demonstration that full health was restored when a *small amount of milk* was added to the purified diet. Shortly it was found that the effectiveness of adding fresh milk to a purified diet was due to a number of "hitherto undescribed" essential dietary factors. The term, *vitamin*, used popularly to indicate certain of these food substances, which even in minute amounts make the difference between health and disease, was introduced in 1912.<sup>8</sup> Thus the "deficiency" era was begun.

It has become known in this way that in a diet adequate for the preservation of health and the prevention of disease there is needed a correct proportion and a sufficient amount of water and the chemical component parts of protein, fat, carbohydrate, minerals and vitamins. The necessary nutritive substances must not only be contained in the food, but they must be present in a digestible form and their absorption and utilization must not be interfered with by underlying pathologic processes.

We have much to learn about the limits within which the body can adjust itself to variations in intake of the different vitamins, but within these limits not every deficiency brings about discernible alteration in function. It is only when the limits of safety are grossly overstepped that the morphologic and physiologic effects become detectable by clinical means.<sup>9</sup>

It is not surprising to find that following each new experimental discovery in this field, physicians have been stimulated to search by the use of refined diagnostic measures, applicable to

man, for early evidences indicating a vitamin deficiency. In vitamin A deficiency, there has developed the photometer test,<sup>10</sup> and keratinized epithelial cells in the urine and in scrapings from the cornea are found before the diagnostic sign, xerophthalmia, makes its appearance.<sup>11, 12</sup> In vitamin B deficiency, no very early test has proved acceptable before the pathognomonic signs suggestive of beriberi or pellagra become noticeable. For vitamin C deficiency, it is clear that the x-ray may reveal changes in the long bones before the beaded ribs and the bleeding gums are observed. So too for vitamin D deficiency, the x-ray may portray the characteristic cupping and fraying of the long bones before the rosary or bowed legs are apparent.

Today, as the consequence of the recent advances concerning the chemical and morphologic nature of vitamins, it may be said that we are entering a new era—an era of recognizing *still earlier* states of vitamin deficiency. Quantitative chemical tests are at hand ready for clinical application, whereby the concentration of vitamins A, B<sub>1</sub>, C and D can be measured with a certain degree of confidence. By them it should be possible to appraise not only the nutritional status of the individual with respect to meeting the optimum vitamin requirements, but also to detect the presence of more than one vitamin deficiency in the same individual.

Time will not permit a discussion of the chemical and morphologic characteristics of the vitamins so we will pass directly to the more salient features of the quantitative chemical tests for vitamins A, B<sub>1</sub>, C and D.

For vitamin A, the antimony trichloride test is the one best suited for clinical purposes. Carr and Price<sup>14</sup> found that antimony trichloride produced a blue color with vitamin A. The average value in man on an adequate diet as determined by the Lovibond tintometer is 40 blue units per 100 cc. of serum or approximately 0.95 milligrams per cent of vitamin A. It has been found that the average normal concentration of vitamin A varies with the diet and with advancing age.<sup>15</sup> The unitage is very low in severe infections. With proper precautions and careful selective measurement of color intensity, this is a simple, rapid quantitative test for the analysis of vitamin A in blood serum and tissues.

Turning now to vitamin B<sub>1</sub>, several chemical tests have been suggested which, it is believed, will serve a useful purpose. These are the estimation of bisulfite binding substance, methyl glyoxal and pyruvic acid.<sup>16, 17, 18</sup> Each of these requires further study to determine its clinical applicability. Concerning the pyruvic acid test, Peters<sup>19</sup> has shown that in vitamin B<sub>1</sub> deficiency there is a defect in oxidizing certain carbohydrate intermediates in nervous tissue—in particular, pyruvic acid. Vitamin B<sub>1</sub> is the factor

that serves to promote its oxidative removal. Pyruvates have been found in the blood of patients with beriberi in China, and the blood of experimentally depleted animals contains pyruvic acid in relatively large amounts. The feeding of vitamin B<sub>1</sub> in the diet of depleted animals causes pyruvic acid to disappear and brings about restoration to full health.

The chemical test for vitamin C is the titration method with the dye, indophenol blue, which forms a colorless compound with ascorbic acid. This test is widely used for the analysis of ascorbic acid in urine and tissue. The determination of ascorbic acid in the blood awaits further confirmation before its actual significance can

be stated.cretion was perceptibly affected. Another 1000 milligrams were given before urinary values were increased to 40 per cent of the amount ingested and before the ascorbic acid values in the blood approached the normal level.

It is interesting to point out the close correlation between the chemical tests for vitamin C deficiency and its histologic counterpart. In studies of the liver tissue in twenty-five unselected infants at autopsy, Ingalls<sup>24</sup> found that the ascorbic acid value in six was distinctly below the estimated normal values for liver tissue—15 to 30 milligrams per cent. In these six patients the ascorbic acid values varied between 2.7 and 5.3 milligrams, and in each of

INFANTILE SCURVY

DETERMINATION OF ASCORBIC ACID BEFORE AND AFTER TREATMENT

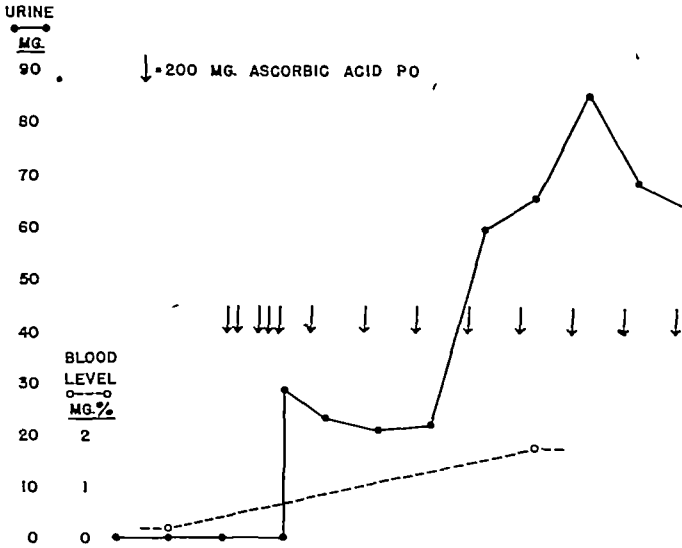


FIGURE 1

be stated. With a barely adequate diet, 20 to 40 milligrams of ascorbic acid are excreted in the urine daily. A series of orally administered test doses of 200 milligrams of ascorbic acid provides valuable information as to the state of vitamin C nutrition, as surplus ascorbic acid is not excreted until adequate storage in the tissues is present. After "saturation" has been reached, 75 per cent of a 200 milligram dose is excreted in the urine within eight hours of ingestion. The average normal value in the blood is 0.8 to 2 milligrams per cent and in the liver is 15 to 30 milligrams per cent.<sup>20 21 22 23</sup>

Figure 1 illustrates the ascorbic acid content in the urine and blood from an infant with advanced scurvy. Note the ascorbic acid values for urine in the left column. The values for blood are indicated in the next column. On admission, there was a negligible quantity of ascorbic acid in the urine and blood. Five doses of 200 milligrams of the crystalline vitamin were administered by mouth before urinary ex-

cretion was perceptibly affected. In another patient who presented both clinical and roentgenologic evidences of acute scurvy during life and the histologic changes of scurvy at necropsy, the ascorbic acid content of the liver was negligible.

Before rickets is recognizable clinically, the determination of calcium and phosphorus in the blood serum indicates that optimal amounts of vitamin D are not available. A serum phosphorus of less than 3 milligrams per cent and a calcium and phosphorus product of less than 40 indicate moderate or severe rickets. It should be emphasized that the calcium and phosphorus figures require evaluation as to activity of growth and with the level of serum protein.

It has been claimed that the most sensitive test for detecting active or current rickets is found by measuring the phosphatase in the blood. In the beginning of the disease it is increased and does not return to normal until healing is

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Time will not permit a discussion of the chemical and morphologic characteristics of the vitamins so we will pass directly to the more salient features of the quantitative chemical tests for vitamins A, B<sub>1</sub>, C and D.

For vitamin A, the antimony trichloride test is the one best suited for clinical purposes. Carr and Price<sup>14</sup> found that antimony trichloride produced a blue color with vitamin A. The average value in man on an adequate diet as determined by the Lovibond tintometer is 40 blue units per 100 cc of serum or approximately 0.05 milligrams per cent of vitamin A. It has been found that the average normal concentration of vitamin A varies with the diet and with advancing age.<sup>15</sup> The unitage is very low in severe infections. With proper precautions and careful selective measurement of color intensity, this is a simple, rapid quantitative test for the analysis of vitamin A in blood serum and tissues.

Turning now to vitamin B<sub>1</sub>, several chemical tests have been suggested which, it is believed, will serve a useful purpose. These are the estimation of bisulfite binding substance, methylglyoxal and pyruvic acid.<sup>16, 17, 18</sup> Each of these requires further study to determine its clinical applicability. Concerning the pyruvic acid test, Peters<sup>19</sup> has shown that in vitamin B<sub>1</sub> deficiency there is a defect in oxidizing certain carbohydrate intermediates in nervous tissue—in particular, pyruvic acid. Vitamin B<sub>1</sub> is the factor

interests would be advanced by a pathologist, which led to Dr Wolbach's and Dr Howe's successful endeavors to characterize vitamin deficiencies pathologically.

Dental caries is rare in primitive people and is to be associated with so-called civilization. The incidence of caries in children may be reduced by regulation of the diet as Dr Howe, among others has demonstrated. Oliver Wendell Holmes would cer-

tainly be pleased to realize that as one of the real founders of dental education at Harvard he had helped pave the way for the recognition that the development of dentistry and medicine must go hand in hand and be increasingly closely associated. "The Relation of Avitaminosis to Oral Pathology" is a significant topic. The Thomas Alexander Forsyth Professor of Dental Science, Dr Howe will speak to us on that subject.

## THE RELATION OF AVITAMINOSIS TO ORAL PATHOLOGY

BY PERCY R. HOWE, DDS\*

**T**he most common pathologic lesion of the oral cavity is decay of the teeth. Until 20 years ago dental caries was supposed to be due to the fermentation of carbohydrate material with the formation of lactic acid. The acid was supposed to eat its way into the tooth, forming the cavity. Bacterial examination of carious material showed lacto-bacilli to be present in the cavity. However, no one has as yet succeeded in producing caries in animals by means of these bacteria or by feeding fermentable sugars or starches. Added to this is the widespread prevalence of dental caries, the incidence of which is estimated by competent authorities to be about 95 per cent among school children. Doubt has arisen as to the entire validity of this theory. Caries has, however, occurred among animals on diets deficient in vitamins and in calcium or phosphorus. The precise cause remains obscure and affords a subject for further study.

Pyorrhea is nearly as common as caries, occurring more often in adults than in children. The bacterial aspect of this disorder has also been relegated to a secondary position. It is generally conceded that pyorrhea is not a distinct disease entity but is a symptom of an anomalous metabolic condition. Lesions similar to it follow in scorbutic or rachitic feeding.

The incidence of both caries and pyorrhea is as great, if not greater, than it was 50 years ago.

Disturbance of the normal growth and development of the bones that form the structure of the oral cavity, resulting in irregularity in the position of the teeth and of the constriction of the nasal passages, has followed in animals when they have been deprived of vitamin C or D.

The effects of a deficiency of vitamin A, C or D on tooth structure during the formative period have been described in detail in the literature. It is well understood that the most striking effects are produced early in life and that they may be carried so far as to result in permanent deformity of calcified tissues.

The temporary teeth begin to calcify at about the third fetal month. Caps of the permanent teeth are found at five and one-half months. The mandible, from a single center of ossification, is the first bone to calcify with the exception of the clavicle. The maxillae begin to ossify from six centers of calcification at from the sixth to the eighth fetal month. The process continues rapidly during infancy and young childhood. Interruption of the normal process is followed by defective teeth and irregularity in their arrangement. At this time in life these matters are in the hands of the medical practitioner. The dentist sees the teeth only after their eruption. His efforts are mainly reparative or corrective. He is fitted neither by training nor by experience to give authoritative advice on nutritional matters.

While there is much that is obscure concerning dental conditions and, while the need for protracted investigation is self-evident, sufficient evidence has been disclosed to indicate that the dental disaster of today is largely due to mineral and vitamin deficiencies.

There is some evidence to be seen in vitamin studies that supports the finding of diffraction studies, in that unsuspected changes occur in the organic substance of teeth and bones in such a condition as rickets. The organic substances of the teeth have not been studied to any extent and await investigation. The whole subject of tooth structure was disregarded until the studies of Mrs. Mellanby, Zulva, Wells and some investigators here began to show that tooth structure and dental caries were associated.

Vitamin investigation has clearly shown that the teeth do not stand apart from the rest of the body but that, on the contrary, they are intimately associated with its physiological processes. The same pathologic response to vitamins A, C, or D deficiency and to recovery therefrom on furnishing the deficiently fed animal with the missing factor is seen in the teeth as elsewhere.

While absolute deficiency of these vitamins enables the student to study the cellular performance in tissue in a clear-cut fashion, in clinical practice latent, protracted and often unrecognized effects are encountered. These are at the moment under investigation, and it is prob-

Howe, Percy R.—Alexander Forsyth Professor of Dental Science, Harvard Dental School. For record and address of author see "This Week's Issue" page 115.

complete. In this respect it is a more reliable and sensitive index than the information secured from the calcium and phosphorus product and the x-ray. Further information is needed to determine the significance of phosphatase as an indication of early vitamin D deficiency.<sup>23 24</sup>

# MULTIPLE VITAMIN DEFICIENCY

## RICKETS AND SCURVY

*Patient* A 4 mos old female Wt. 11 lbs

*Diet* Cows milk formula

Never given cod liver oil

Never given orange juice

*Physical Signs* Anemia, tenderness of limbs  
Beading of ribs craniotabes

*Roentgenogram* "Somewhat suggestive of scurvy"

### Chemical Tests

	Admission	Discharge
Ascorbic Acid (Blood)	0.0 mg %	0.45 mg %
Calcium	8.2 = 27.88 P	10.4 = 47.84 P
Phosphorus	3.4	4.6
Phosphatase	0.29 Kay units	—

FIGURE 2

In figure 2, data are given illustrative of a multiple deficiency state. An infant of four months was studied with equivocal symptoms and physical evidences and roentgenologic signs of rickets and scurvy. Note the chemical tests, as they suggest the presence of both rickets and scurvy. On admission the ascorbic acid in the blood was 0, the calcium and phosphorus product was 27.88 and the phosphatase test was high normal—0.29 units. Treatment for rickets and scurvy was followed by a return of ascorbic acid to 0.45 milligrams per cent with a calcium and phosphorus product of 47.84.

To reiterate, we have ready for clinical application chemical tests for the detection, quantitatively, of four specific vitamins. For vitamin A there is the antimony trichloride test, for vitamin B<sub>1</sub> further work is needed to determine the value of the pyruvic acid test, for vitamin C there is the indophenol test, and for vitamin D there is the phosphatase test, as well as the calcium and phosphorus measurements of the blood. In conclusion it should be emphasized that much remains to be done. As in the past, every new technical procedure has required modifications or adaptation for ease of performance and precision before it has become practical and applicable for the study of disease in man. So with the chemical tests for vitamins it will be necessary to accumulate a vast number of data for setting up accurate standards in health and in disease to serve as guideposts by which states of vitamin deficiencies may be detected earlier than has been possible heretofore.

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CHAIRMAN MINOT. A new day has dawned for dentistry—a day of organized research and one of great importance to human welfare because the prevention of dental disorders is the prime object. Dental problems should be studied in relation to man as a whole and thus concern all branches of medicine. There is no better example of this than the effect of diet on teeth and their adjacent structures. Dr. Howe in 1914 was the first person in America to carry out experimental observations concerning this subject. He has indicated that subclinical scurvy can be responsible not only for defective dentition but also for most types of malformation of the bony structures of the mouth. In 1924 Dr. Robert W. Lovett as a member of the Board of Trustees of the Forsyth Dental Infirmary, appreciated that Dr. Howe's

gross nor microscopic studies of peripheral nerves and spinal cords reveal differences between the first named polyneuritides, although it is not difficult to differentiate them pathologically from the toxic group

If, then, alcoholic, pregnancy, and beriberi polyneuritides are clinically and pathologically identical, is there not perhaps etiologic identity? Several years ago Dis Minot, Cobb and I first considered the food intake of patients suffering from "alcoholic" polyneuritis. The difficulties involved in obtaining adequate dietary histories from individuals who customarily pay more attention to, as well as more money for, ardent spirits than food need not be enlarged upon here. In 53 such patients, however satisfactory data were obtained. In 2 of these patients the usual diet could be considered adequate, it not optimal for nutrition. The remaining 51 patients had eaten for at least months and frequently over a period of years only very little fresh food of any kind and almost always sparsely of protein foods. In general it is this latter class of foods that supplies the bulk of the vitamin B complex in human diets. The caloric intake of these patients was supplied chiefly by concentrated carbohydrate foods and alcohol. The reason for the limited dietaries of these individuals was threefold. First then economic circumstances were such that there was rarely enough money for both food and drink. Food to them, was of lesser importance. Secondly the prolonged excessive use of alcohol frequently resulted in an irritative gastritis associated with anorexia. Thirdly, since a quart of whiskey contains at least 2800 calories, their total caloric intake was frequently high without the addition of other food.

From data on mice, rats, dogs and pigeons, Cowgill has determined that the vitamin B requirement is a function of both the weight of the subject and the total daily caloric intake. Although many of our patients may have taken sufficient vitamin B for their caloric intake of food their requirement for this vitamin was greatly increased by virtue of the large number of calories which they imbibed as alcohol. Recently Jolliffe and his associates have corroborated our observations and have shown that although 18 of their 26 alcohol addicts with polyneuritis had an adequate vitamin B intake when the calories from alcohol were neglected, all were deficient when these calories were included in the calculation.

The second consideration in the study of patients with alcoholic polyneuritis was the state of the gastric secretions, since there is considerable evidence that virtual deficiencies of nutrition may arise in spite of an adequate diet if gastrointestinal defects are present. Gastric analyses were performed on 50 patients, of

whom only 10 secreted normal amounts of free hydrochloric acid.

If the multiple neuritis of the alcohol addict is due to a nutritional deficiency, and particularly to a lack of some portion of the vitamin B complex, one would anticipate that a certain number of these patients would have manifestations of deficiencies of other nutrient factors, especially other parts of the B complex. It is hence of interest that 17 of our 67 cases had dermatitis and other lesions characteristic of pellagra, 12 had edema, and in 1, signs of acute myocardial failure vanished rapidly with no other therapy than rest in bed, a little food and large amounts of a concentrate of the vitamin B complex.

These data, then, confirmed the hypothesis, first advanced by Shattuck ten years ago, that the multiple neuritis of the alcohol addict is a dietary deficiency similar to polyneuritic beriberi, and not the result of a direct toxic action of alcohol. Conclusive proof, however, could only be furnished by demonstrating that these patients would recover while they continued to consume their usual daily quota of alcohol, if they were supplied with an adequate intake of food factors. Accordingly, 10 patients with uncomplicated "alcoholic" polyneuritis were selected for study. By careful questioning the usual daily intake of spirituous liquor was determined in each case. Such an amount (from 1 pint to 1 quart) of whiskey was then administered daily to each patient throughout the period of study. At the same time each patient received, as a daily minimum of food, 2 eggs, 500 cc of milk, 200 gm of beef or lamb, 240 cc of orange juice, 4 servings of green vegetables, 90 gm of brewer's yeast or its equivalent and by intramuscular injection daily, a vitamin B concentrate. Without exception the polyneuritis of each of these 10 patients was relieved over a period of 2 to 18 weeks during the constant administration of large quantities of whiskey. It is thus apparent that the ingestion of strong alcoholic beverages, up to a quart a day, has no demonstrable neurotoxic effect on peripheral nerves in patients receiving an adequate diet and vitamin B supplements. Such data, however, can be construed just as Eijkman did his to indicate that vitamin B or some other dietary factor serves as an antidote for the otherwise poisonous effects of alcohol. The data likewise do not eliminate the rather remote possibility that an impurity in the beverage alcohol consumed prior to the onset of the polyneuritis was responsible for the nerve lesion. However they clearly indicate that the administration of large amounts of pure blended whiskey in no way prevents the relief of "alcoholic" polyneuritis when the patients are adequately nourished. The "toxic" polyneuritis of pregnancy is a condition clinically and pathologically identical

able that the dental manifestation of such states is what is so often observed

The few facts that have been disclosed regarding the effect of food deficiencies on the teeth have already been put to clinical tests with notable dental improvement, as well as improvement in the general physical condition

The effect of vitamins on other oral tissues cannot here be described because of the limited time at my disposal. Nor can it be undertaken to indicate special subjects for future research, except to state that for a fuller understanding of the modus operandi of vitamin activity in its relation to oral pathology the work must of necessity lead off into what may seem to be far afield

It is the hope of present day research workers that medical men will work to build good dental conditions by advising proper nutrition in prenatal and early postnatal periods, in so far as this is understood, and that dentists will regard dental pathology not as an isolated situation, but as the result of general physiologic conditions. Only with the cooperation of the medical profession can dentists hope to eliminate such oral pathology as is apparently due to vitamin and mineral deficiency

Dr Howe then demonstrated a series of lantern slides showing especially, bone defects from dietary deficiency

CHAIRMAN MINOT Defective nutrition can be responsible for nervous and mental disorders. Such conditions can arise from deficiency in the caloric intake as well as from deficiency of certain specific diet factors. The serious nerve lesions of beriberi, pellagra and pernicious anemia are to be attributed to lack of food-derived substances. Animal experimentation has shown the disastrous effects of avitaminosis on the nervous system

James Jackson, our second Hersian Professor of the Theory and Practice of Physic in his classic description of alcoholic polyneuritis noted that these patients suffer from disordered digestion and that in treatment "animal food was most useful." Some what over 100 years later Harvard investigators recognizing the similarity of the symptomatology and pathology of beriberi and of alcoholic polyneuritis, gave evidence that dietary deficiency plays an important role in the production of polyneuritis in chronic alcoholic cases. That the polyneuritis of pregnancy is a dietary deficiency disorder was first shown definitely by Dr. Strauss and Dr. William J. McDonald. At Harvard it was also first shown that the neural lesions of pernicious anemia could be entirely prevented by liver therapy. Dr. Strauss has been intimately associated with these various studies concerning "Nerve Disorders Arising from Defective Nutrition," about which he will speak to us

## NERVE DISORDERS ARISING FROM DEFECTIVE NUTRITION\*

BY MAURICE B. STRAUSS, M.D.†

THE concept that nerve disorders might arise from defective nutrition may properly be said to have originated in 1897 with the work of the great Dutch investigator, Christiaan Eijkman. At that time, however, the brilliant bacteriologic researches of Pasteur, Koch and their followers so overshadowed other developments in medicine that physicians became imbued with the thesis that only positive agents—the bacterium, the parasite, the toxin—could cause disease. Hence Eijkman, although he had clearly established the fact that polyneuritic beriberi was due to a deficiency of something in food, was unwilling to advance so heretical a doctrine and, instead, suggested that foods such as polished rice, being overrich in starch, produced a substance in the intestine which was "poisonous" to nerve cells and for which the outer layers of rice acted as an antidote. During the past forty years, however, the further researches of Eijkman and those of Vordermann, Griggs, Hopkins, Strong and McCarrison, among a host of others, have firmly established the fact that polyneuritic beriberi is the result of a dietary

deficiency and that the substance missing is a portion of the vitamin B complex

I plan to discuss today three nerve disorders which, like beriberi, have long been considered of toxic origin—"alcoholic" polyneuritis, "toxic" polyneuritis of pregnancy and subacute combined degeneration of the spinal cord

The use of alcohol appears to be of considerable antiquity. Certainly it was known to the son of Noah, if not earlier, and throughout the years there has been a belief that its use is sinful. It is therefore quite understandable why John Coakley Lettsom and James Jackson, over a century ago, upon first describing what is now commonly known as alcoholic polyneuritis, should have considered the nerve injury due to the alleged poisonous effects of alcohol. However, observations in recent years have shown that the clinical findings in this condition are in no way distinctive for users of alcohol. Even minute neurologic examination fails to differentiate "alcoholic" polyneuritis, pregnancy polyneuritis, polyneuritis arising in cases where intestinal absorption is severely handicapped and beriberi polyneuritis, although it is a comparatively simple matter to distinguish the obviously "toxic" polyneuritides, such as those due to lead, triortho cresyl phosphate and diphtheria toxin. Moreover, neither

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None of these proved practical, but Hagedorn succeeded by precipitating insulin with a mono-protamine derived from the sperm of fish and then adjusting the pH of the mixture to conform to that of the body. In this ingenious fashion the absorption of active insulin from the subcutaneous depot was delayed and the length of action of insulin was doubled. This helped to open the way for still further improvements by which zinc or calcium were introduced into protamine insulin, which prolonged its action for over twenty-four hours and thereby made possible the treatment of nearly all diabetes requiring the use of insulin with injections but once a day.

Simplicity of treatment is now assured. The technic of diet and insulin is easily mastered. With the carbohydrate content of the diet about 150 grams, protein suitable to the age, weight and physical condition of the patient, and fat for maintenance of nutrition it is easy to instruct a patient what to eat. Thus, with a slice of bread and butter and an orange or their equivalents at each meal, a moderate portion of cereal, 5 and 10 per cent vegetables in liberal quantities, and milk one-half pint and cream one-quarter pint or the reverse of the same, one has 150 grams of carbohydrate. As for insulin medication, one can start with protamine zinc insulin 10 units the first day and increase 10 units daily up to 40 units, unless before that time it is evident the urine is becoming sugar-free. If this is not the case, regular insulin can be added by separate injection at the same time as the protamine insulin before breakfast, beginning with 5 units and increasing the dose by 5 units daily. Seldom will it be necessary to raise the regular insulin above 20 units and protamine insulin 40 units in order to control the diabetes.

The secret of success in the use of protamine insulin is the recognition that it acts much more slowly than regular insulin. Its ultimate and good effect may not show for several days, a week or even longer. One must allow time to find out what its capabilities are. Particularly is it necessary to proceed slowly when changing a patient from regular insulin to protamine insulin or when a combination of regular insulin and protamine insulin is employed. Surely allow a week for the transfer or you will rue it. Remember that if sugar shows in the late forenoon, regular insulin may need slight increase, but if the urine is sugar-free on rising the regular insulin may require diminution. If sugar shows during the latter part of the day and particularly on rising the protamine insulin may need an increase. Sometimes, however, sugar will show on retiring because of too great a load of carbohydrate and because of the slow but persistent action of the protamine in-

sulin or the mild character of the disease, the urine will become sugar-free before morning. Thus, caution should be employed in giving regular insulin on rising because with a normal blood sugar it may act so quickly that a reaction may occur even before breakfast. Indeed regular insulin, if given at the same time as protamine insulin, should be injected at a shorter interval before breakfast than if it is given alone. On the other hand, it is a comparatively indifferent matter as to the exact minute when protamine insulin is injected. The effect of the slow action of protamine insulin must be considered in the arrangement of the diet and in the treatment of reactions.

The dietitian again comes into her own diabetic sphere with the discovery of protamine insulin, because protamine insulin powerful though it is, cannot overcome the peak carbohydrate load of diabetic diets hitherto employed and their rearrangement is essential. A greater space of time between meals becomes necessary—an earlier breakfast and a later dinner. The concentration of food into nine hours, as so often practiced in hospitals with an eight o'clock breakfast and a five o'clock supper, is out of the question with the modern diabetic taking protamine insulin. Not only should the early and late meals be spread apart but a portion of the carbohydrate should be given during the forenoon, afternoon and upon retiring. Only in this way can one take full advantage of this new medicine, indeed, by so doing the liability of insulin reactions becomes remote.

Insulin reactions (hypoglycemia) can occur with protamine insulin, it is true, but if the diet is distributed throughout the twenty-four hours they are far less apt to develop. Protamine insulin is a powerful, although a slowly moving force, and even if a patient comes out of a reaction one hour, he may require treatment at each of several subsequent hours. This is one of the reasons why always in the use of the protamine insulin one should not be misled by single tests of the urine and blood, but rather be guided by the general trend of these tests. Insulin reactions due to protamine insulin are generally recognized earlier by the patient and may be thwarted, if he is alert and understands how insulin and protamine insulin behave. They are most apt to develop following the use of both regular and protamine insulin, but they can occur with protamine insulin alone and although this is seldom the case they can be extremely violent, requiring not only large quantities of carbohydrate by mouth but intravenously as well. Here it is that knowledge helps the diabetic and to prove it you, and doctors like you have furnished me the evidence, because more than 300 doctors have been under my care for diabetes.

Diabetic doctors obviously understand some-

to alcoholic and beriberi polyneuritides. Of the cases reported in the literature concerning which the data are available, all but a few have occurred in women who had had persistent, so-called "pernicious" vomiting over a period of weeks or months, as first noted by Whitfield. It is apparent that, irrespective of the intake, vomiting may result in severe dietary deficiency. Furthermore there is a general tendency to administer concentrated carbohydrate foods to such patients. In pregnancy it has been demonstrated that gastric secretory defects are the rule and may play a role in conditioning nutritional deficiencies. Furthermore, since it has been shown that the vitamin B requirement is directly proportional to the metabolic rate, the 20 per cent increase in metabolism that is of normal occurrence in pregnancy must increase the demand for vitamin B proportionately. Finally, and of greatest significance, is the fact that there are few recorded instances of recovery from the polyneuritis of pregnancy during gestation when treatment along conventional lines has been employed, whereas almost all the patients have recovered when they have received adequate supplements of vitamin B and other dietary factors.

Subacute combined degeneration of the spinal cord may perhaps occur independently but is usually associated with two known deficiency diseases, pernicious anemia and pellagra. Gildea, Castle and their associates, Mellanby and others have shown that animals fed on deficient diets may develop spastic paralysis associated with degeneration of the spinal cord, which bears certain similarities to the disease in man. Since subacute combined degeneration of the spinal cord associated with pernicious anemia may progress to a fatal termination, in spite of the fact that the patient is receiving sufficient therapy to maintain the blood at an approximately normal level, it has frequently been assumed that the cord lesion resulted from some unknown toxic factor and could not be influenced by therapy directed at supplying a nutritional lack. However, a series of studies carried on here during the past five years has demonstrated that subacute combined degeneration of the

spinal cord treated by the intramuscular injection of liver extract in suitably large amounts can be entirely arrested. One cannot expect nerve cells and fibres in the central nervous system to regenerate once they have been completely destroyed, but in every instance the process of destruction has ceased and there has been no recurrence. The degree of improvement in the patient's condition that occurs once the degeneration has been arrested will depend on various factors, but not infrequently bedridden patients have been returned to their normal occupations. It is to be emphasized that the amount of liver extract employed must be sufficient for the individual case, no matter how much this may exceed the average dose. These data, then, point strongly to the hypothesis that the spinal cord lesion under consideration is the result of the deficiency of some factor that is present in liver extract.

In summary, then, it may be said that the researches of the past decade outlined above suggest that at least three nerve disorders, "alcoholic" polyneuritis, pregnancy polyneuritis and subacute combined degeneration of the spinal cord, each formerly considered of toxic origin, arise from defective nutrition, and may be successfully treated by supplying the deficient material.

**CHAIRMAN MINOT:** We have learned this afternoon particularly about nutritional disorders dependent on the lack of specific food substances. Nutritional defects can arise because of an inability to utilize food substances owing to a defect in some endocrine mechanism as takes place in diabetes. Dr. Joslin's classic book on this subject indicates the triumphal march he has watched and shared in since he graduated from this school 41 years ago—fully as active today as then. He has been alert, investigating and adding knowledge during the periods which he wisely designates as the Naunyn, the Allen and the Banting and Best eras of diabetes. An acknowledged master and leader in the field of diabetes, he once more proves himself responsive to what is new and serviceable. He was the first in this country to take up the study of Hagedorn's discovery of the benefits of a compound of protamine and insulin which was first publicly announced in Copenhagen about one and a half years ago. Dr. Elliott Proctor Joslin will tell us about the rapidly developing knowledge of Protamine Insulin and Its Advantages.

## PROTAMINE INSULIN AND ITS ADVANTAGES

BY ELLIOTT P. JOSLIN, M. D.\*

**T**HE most notable advance in the treatment of diabetes since the introduction of insulin in 1922 has been the introduction of protamine insulin by Hagedorn of Copenhagen. Wonderful as were the results achieved by the use of insulin, made available to the world by the Toronto investigators, Banting and Best in association with MacLeod and Collip, the handi-

cap remained that the duration of its action was comparatively short and for many cases of diabetes three or four injections a day were required. To overcome this handicap various procedures were tried in the hope of delaying absorption, such as the insertion of the needle into thick adipose tissue, the mixing of insulin with gum arabic, various proteins, oil or lecithin, its combination with pituitrin or adrenalin, and finally with ferric chloride and tannic acid.

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# The Massachusetts Medical Society

## PROCEEDINGS OF THE COUNCIL

Special Meeting, November 19, 1936

**A** SPECIAL meeting of the Council of the Massachusetts Medical Society was held in John Ware Hall, Boston Medical Library, on Thursday, November 19, 1936, at 11 00 o'clock. The following 120 Councilors were present

### BARNSTABLE

M E Champion  
S M Beale Jr  
W D Kinney  
J I B Vail

### BERKSHIRE

W T Frawley

### BRISTOL NORTH

W H Allen  
F V Murphy

### BRISTOL SOUTH

E F Cody

### ESSEX NORTH

E S Bagnall  
R V Baketel  
C S Benson  
J F Burnham  
Z W Colson  
H F Dearborn  
G L Richardson  
W D Walker

### ESSEX SOUTH

J F Jordan  
C H Phillips  
J W Trask

### FRANKLIN

W J Pelletier

### HAMPDEN

P E Gear  
E A Knowlton  
M W Pearson  
G L Steele

### MIDDLESEX EAST

J H. Kerrigan  
J H Blaisdell  
Richard Dutton  
E. M Halligan  
R R Stratton

### MIDDLESEX NORTH

F P Murphy  
A. R. Gardner  
T A. Stamas  
E O Tabor  
M A Tighe

### MIDDLESEX SOUTH

S H Remick  
C F Atwood  
E W Barron  
E H. Bigelow  
B F Conley  
D F Cummings  
H F Day  
D C Dow  
A W Dudley  
W G Grandison  
C M Hutchinson  
A. A Levi  
F P Lowry  
R A. McCarty  
L. W McGuire  
J A. McLean  
Edward Mellus  
C E Mongan  
J P Nelligan  
E J O'Brien Jr  
C T Porter  
W D Reid  
T E Reilly  
E S A. Robinson  
E J Sawyer  
M J Schlesinger  
E F Sewall  
H P Stevens  
H W Thayer  
Fresenius Van Nûys

### NORFOLK

Maurice Gerstein  
F G Balch  
H G Batchelder  
A S Begg  
D D Berlin  
H K Boutwell  
D G Eldridge  
H M. Emmons  
I A Finkelstein  
C S Francis  
J B Hall  
L F Johnson  
W B Keeler  
C J Kichham  
H M Landesman  
W A. Lane  
J S H Leard  
Samuel Nadel  
H. C Petterson  
Frederick Reiss  
M V Safford  
H. F R Watts

### NORFOLK SOUTH

T B Alexander  
R L Cook  
W G Curtis  
G V Higgins  
F E Jones

### PLYMOUTH

P H Leavitt  
F F Weiner

### SUFFOLK

Conrad Wesselhoeft  
H L Blumgart  
C S Butler  
Lincoln Davis  
R. L DeNormandie  
Reginald Fitz  
Channing Frothingham  
E P Joslin

### R I Lee

C C Lund  
J P O'Hare  
R B Osgood  
L E Parkins  
Helen S Pittman  
R M Smith  
M C Sosman  
E F Timmins  
I J Walker

### WORCESTER

R J Ward  
J C Austin  
W P Bowers  
G A Dix  
G E Emery  
A W Marsh  
E H Trowbridge  
F H Washburn  
R P Watkins

Immediately after the call to order the President, Dr Mongan, declared the meeting to be in executive session. The Council passed the following motions

1 To approve of the action taken by the eighteen district presidents at the meeting held on July 15, 1936, in forwarding to His Excellency, the Governor, certain resolutions expressing confidence in the conduct of the Department of Mental Diseases and recommending the reappointment of the Commissioner in office at that time. It was pointed out that, when these resolutions were adopted and passed there was no other candidate before the Council and the action was intended to assist the Governor in his choice of a Commissioner.

2 It was voted to confirm the action of the President of the Massachusetts Medical Society on November 10, 1936 asking the Governor and Council for an opportunity to be heard in the matter of the proposed appointment of a Commissioner of Mental Diseases.

3 The following resolution was passed

Whereas The statute of the Commonwealth requires that the Commissioner of Mental Diseases be a physician expert in the care and treatment of the insane therefore be it

Resolved That the Council of the Massachusetts Medical Society direct the President to convey to the Governor and Council its conviction that the most careful consideration be given to the matter of the qualifications of any person suggested for appointment as Commissioner of Mental Diseases.

The meeting adjourned at 11 45 a m

ALEXANDER S BEGG Secretary

thing about diabetes. By no means are they or you infallible, but none the less my diabetic doctors have demonstrated several facts:

1. Today you cannot get a diabetic doctor to die of diabetic coma! Indeed, not one death from diabetic coma has taken place among my 300 diabetic doctors during the last 14 years. If a doctor will not die of diabetic coma, why should he permit a patient to do so?

2. Up into middle age the death rate of my diabetic doctors is less than one-quarter that of my other patients of similar age.

3. The average age of death for doctors in the United States is 63 years, but for my diabetic doctors, many of whom, I will allow, contract their diabetes above the age of 40, it is 68 years.

Knowledge counts. All diabetics cannot study to be doctors, but I am convinced that the more my diabetics learn what my diabetic doctors know about diabetes, the longer they will live.

#### PRACTICAL POINTS IN THE ADMINISTRATION OF PROTAMINE INSULIN

I am definitely advised that protamine insulin, when combined with zinc or calcium, will not lose more than 10 per cent of its strength in 6 months, even if not kept in the ice chest. In other words, a patient taking 20 units of protamine insulin at the end of 6 months may require 22 units of the same supply. Even when the protamine and buffer have been mixed with insulin, I am likewise assured its strength will not deteriorate for upwards of 3 weeks\* or for practical purposes until the contents of the bottle are exhausted. Protamine and insulin can be mixed and injected at once, but it may be a trifle better to allow the mixture to remain overnight before use. In the administration of regular and protamine insulin we have for purposes of future study, arbitrarily adopted the plan of injecting regular insulin into the left half of the body and protamine insulin into the right half. Local reactions from protamine in-

sulin occur just as they do with regular insulin and perhaps somewhat more frequently, but with time disappear. The efficacy of protamine insulin lies in the precipitate. Consequently, one should twist or gently turn the bottle after mixing the two solutions instead of creating a foam by shaking violently, because the particles of protamine insulin might collect in the foam. Fortunately with the newer combinations, protamine calcium insulin and protamine zinc insulin, the precipitate is more finely flocculent and uniform and less likely to adhere to the walls of the bottle. If a clear fluid is present in the bottle after mixing, it is valueless because there is no insulin in it. In the administration of regular insulin and protamine insulin the same syringe can be employed, but regular insulin should be given first. The syringe and needle can be sterilized as usual with alcohol and neither need be absolutely dry.

#### CONCLUSIONS

1. A single injection of protamine insulin replaces multiple injections of regular insulin.

2. Due to its slow action the danger of insulin reactions is lessened.

3. Its prolonged effect, extending throughout the entire 24 hours, insures far more efficient control of the diabetes, greatly reduces the liability to coma or slowly developing complications of the disease and thus offers the diabetic almost a return to normal health.

4. The simplicity of administration of protamine insulin will appeal to the great mass of diabetics of mild and moderate degree, many of whom have needed but have not taken insulin, and thus should raise the standard of treatment of diabetes throughout the world. Perhaps this will be its greatest use.

5. Hagedorn's discovery of protamine insulin has opened up research in the treatment of diabetes along new avenues and I believe it only just and proper to name the new era thus begun after its discoverer—the Hagedorn era.

CHAIRMAN MINOT. I declare that the Nutrition Symposium is completed and the nutritious hospitality of the medical school faculty and faculty wives will be found in the courtyard.

\* I know that the protamine zinc insulin when combined in one bottle retains its full potency for more than 4 months because of results obtained with eight of our standard cases.

prapubic cystotomy for the removal of a calculus 25 centimeters in greatest diameter. She was 23 years old on admission. At the age of 14 she had been under treatment for 6 months because of urinary frequency with burning and pain. A diagnosis of renal tuberculosis had been made. During this period incontinence developed. It persisted for 1 year and then ceased. She was then well until the age of 20 when she related, seven stones were passed in 3 days. Following this episode her course had been uneventful until she became pregnant 10 months before admission. Incontinence ensued until she miscarried at 4 months. Two weeks later she experienced much pain and hematuria with the passage of sand. Six weeks before entry incontinence recurred associated with almost constant pain. Genito-urinary studies revealed fistula calculus and bilateral renal tuberculosis with calcification more marked on the right. By x-ray the lungs showed no evidence of tuberculosis. Four and one-half months after cystotomy the right kidney and upper ureter were removed. Convalescence was slow and the patient was not discharged until 3 months after nephrectomy. After a short stay at a sanatorium she left against advice. Two years and one month after cystotomy she was symptomatically well.

Three vesicovaginal fistulas healed without interference 3, 5 and 7 months, respectively, after radical operations for cancer of the cervix. A left ureterovaginal fistula following a complete hysterectomy closed spontaneously 8 months later at which time an intravenous pyelogram was normal. Ureteral trauma was not suspected at operation. Leakage began within 10 days. Presumably the ureter had been caught in a suture.

These 6 cases constitute this clinic's experience with spontaneous closure, but are not included in the series because repair was not performed. It is interesting to note that of the 16 failures in the series (2 were operative deaths), 9 were followed for 4 months, 9 months, 1 year and 4 months, 1 year and 9 months, 3 years, 3 years, 6 years, 9 and 30 years, respectively, and spontaneous closure did not occur. If this fortunate outcome is to take place, evidence of less leakage, such as pads moist instead of soaked, no leakage unless bladder fills beyond a certain capacity and leakage only on lying, standing, sitting or walking, will probably appear rather early, as indicated by the cases in which closure did come about without interference.

**Bladder calculus.** Occasionally treatment is complicated by the presence or development of a stone. With the exception of the above instance, a calculus has not been found in a previously untreated case. The possible causes are failure to remove entirely nonabsorbable sutures, infection, stasis, alkaline urine, vitamin deficiency and endocrine dysfunction. The 3 cases of bladder calculus in this series are as follows:

**CASE 1.** Mrs. M. D., aged 32 years, 6 years before admission had had a vesicovaginal fistula which fol-

lowed a high forceps delivery. This was repaired at another clinic 6 months later and the patient was well until a year before admission, having had a second (normal) delivery 2 years after the first and a hemorrhoidectomy. Her symptoms were frequency and difficulty in voiding. She had to press on the bladder from below to void. Two months before entry leakage recurred. A 3 centimeter calculus was removed through a vesicovaginal fistula of almost the same size. In addition two silver wire sutures were excised when the edges of the opening were trimmed. The fistula became rapidly smaller but the outcome is unknown, since the patient ceased reporting. Though not likely, the sinus may have closed spontaneously.

**CASE 2.** Mrs. E. S., aged 32 years, was admitted because of urinary incontinence 4 months after the delivery of a stillborn infant. She had a complete laceration of the perineum, scarring of the upper fourth of the vagina and a 2 millimeter vesicovaginal fistula whose inner end was close to the opening of the left ureter. The fistula was closed with silver wire, great difficulty being encountered because of excessive and intractable scarring. Four weeks later the sutures were removed, the suture count being correct, and the perineum repaired. In 31 days the patient was discharged cured. One year and five months later she returned with a story of having had painful urination with the passage of gravel and blood 7 weeks before. Cystoscopy, though indicated, was not done. Another fistula was present. It recurred soon after repair and was again closed only to appear within a month. Cystoscopy then revealed a stone. Shortly afterward a fourth attempt at repair was made at which operation a 3 millimeter calculus was taken from the bladder through the sinus. This and a fifth operation were unsuccessful. This case is listed below among the failures, despite the fact that it seemed likely that the severe scarring and the development of stones rather than any flaw in technique, contributed chiefly to the unsatisfactory result.

**CASE 3.** This patient, Mrs. B. B., aged 29 years, had had during the previous year three operations for a vesicovaginal fistula of obstetric origin. The first had been a transvesical repair through a suprapubic cystotomy, the second a hysterectomy with abdominal closure of both fistula and cystotomy and the third a vaginal repair of the fistula. Examination disclosed practically a complete laceration of the perineum, a relaxed and patulous urethra, much scarring at the top of the vagina, absence of the cervix and a vesicovaginal fistula 5 millimeters in diameter, high up. The fistula was closed and the urethra tightened. Six weeks later, 4 days following the removal of sutures, incontinence recurred. The patient was not seen again for 5 years during which period she had had eight reentries at another hospital with final closure of the fistula, although incontinence continued because of an incompetent urethra. Ten months before her return suprapubic cystotomy had been performed for the removal of a calculus 4 by 2 by 2 centimeters and the patient stated that during recent months she had passed blood shreds of tissue and several small stones. On readmission a sloughing ulcerated area was seen in the region of the left ureteral orifice which could not be visualized or catheterized. The surface of the area was soft and crumbly but the material removed for biopsy was amorphous. The introduction of a sound did not give the feeling of a stone. It was thought to be tumor. The right kidney and ureter were normal. Transplantation of this ureter into the sigmoid was performed in anticipation of cystectomy. The left kidney could not be felt be-

## URINARY FISTULAS OPENING INTO THE VAGINA\*

BY FRANK A PEMBERTON, M.D.,† GEORGE VAN S SMITH, M.D.,† AND SIDNEY C GRAVES, M.D.†

ONE hundred cases of urinary fistula have been treated at the Free Hospital for Women in Brookline between 1879 and June, 1936, 57 of these have been seen since 1915

The fistulas of 61 cases were of obstetrical origin, those of 28 were caused by some operative procedure other than for cancer, the remaining 11 were due to cancer or its treatment by operation or irradiation. The types and combinations of fistulas for the whole group are listed as follows

Vesicovaginal	75	Urethrovaginal	3
Double vesicovaginal	5	Double urethrovaginal	1
Triple vesicovaginal	1	Vesicocervicovaginal	12
Vesico- and urethrovaginal	1	Ureterovaginal	2

In addition, 4 cases had vaginal atresia, of which 1 had also a complete laceration of the perineum. Another case had a complete perineal tear. A cancer case had also a rectovaginal fistula. One patient's posterior urethra was completely occluded by scar tissue. In another patient was a draining wound from suprapubic cystotomy. The distal three-fourths of the urethrovaginal septum was found torn in one case. Another patient's distal one-third of the urethrovaginal septum was split open, this and her fistula having followed a plastic operation at home. A large proportion of all the cases had scarring of greater or less degree. Furthermore, local incrustation, cystitis, pyelitis and contracted bladder were not uncommon. Although this report deals chiefly with the closure of fistulas, these associated complications and lesions necessitated both medical treatment and other plastic procedures in addition to those aimed at the repair of fistulas.

As to size, 58 per cent of the fistulas were 2 millimeters or less in diameter, 34 per cent were 3 to 10 millimeters in diameter, 4 per cent were about 15 millimeters in diameter, and 4 per cent were over 2 centimeters in diameter, the largest of the series being 6 centimeters (a recent case, now dry 6 months after one operation).

Sixty-three per cent of the patients whose fistulas followed delivery were primiparous. The data concerning delivery for the entire group with fistulas of obstetric origin are given in table 1. Table 2 summarizes the surgical procedures for the 28 cases whose fistulas followed operation performed for nonmalignant condi-

tions. Eight of these acquired their fistulas at the Free Hospital for Women before 1906—1 from a vaginal plastic, 1 from a complete hysterectomy and 6 from intentional incision as part of the one-time treatment of cystitis.

TABLE 1

DELIVERY NOTES ON 61 CASES OF URINARY FISTULA OF OBSTETRIC ORIGIN

Instrumental (type not stated)	34	(Stillborn—8)
High forceps	6	
Long labor e.g., 2, 3, 3 and 8 days	6	(Stillborn—2)
Indefinite	10	(Stillborn—7)
Normal	1	(Stillborn)
Breech	1	
Posterior position	1	
Face presentation	1	
Vaginal hysterotomy	1	

Total stillborn—18, 29.5 per cent

TABLE 2

PROCEDURES PRECEDING THE DEVELOPMENT OF URINARY FISTULA IN 28 CASES

Complete abdominal hysterectomy	9
Supravaginal hysterectomy	3
Abdominal myomectomy	1
Vaginal plastic	6
Vaginal drainage of postoperative abscess	1
Operation for bladder calculus	1
Insertion of cup-shaped pessary	1
Intentional fistula for treatment of cystitis	6

In considering fistulas associated with pelvic cancer (almost always cervical) it is difficult to determine which are due to the disease and which to its treatment. They are quite common in advanced cancer of the cervix. Actually at this clinic to date 21 urinary fistulas in cancer cases are considered the result of treatment. Eleven fistulas in cancer cases are included in this report because they were repaired. Seven resulted from radical hysterectomy, 2 from irradiation and 2 from the disease.

*Spontaneous closure.* Now and then fistulas close spontaneously after the clearing up of a bladder infection or the removal of a foreign body or during the healing process following the operation that caused the opening. One patient reported herself cured 17 years after irrigations which removed much calcareous material from the bladder and vagina in preparation for operation on a vesicocervicovaginal fistula. She left the country before operation and has not been examined since.

Another patient's vesicovaginal fistula 1 millimeter in diameter, closed 9 months following su-

From the Free Hospital for Women, Brookline, Mass.  
†Pemberton, Frank A.—Clinical Professor of Gynecology, Harvard University Medical School. Smith, George Van S.—Visiting Surgeon, Pathologist and Director of Research, Free Hospital for Women and Fearing Research Laboratory, Brookline, Mass. Graves, Sidney C.—Assistant Visiting Surgeon, Free Hospital for Women, Brookline, Mass. For records and addresses of authors see "This Week's Issue" page 1182.

age is maintained either by a plain tipped soft rubber catheter held by adhesive strips or by a small indwelling silver catheter. These should be watched constantly to make certain they do not become plugged. The bowels are kept open. After the third postoperative day gentle douches of sterile boric acid solution are given. The catheter is removed between the ninth and fourteenth days and the patient allowed up after the fourteenth day. Removal of the sutures is carried out in the operating room with anesthesia, unless they can be easily exposed.

Although the technique of repairing a fistula is often not difficult, the result may be unsatisfactory due to incomplete knowledge of the exact type and location of the sinus, the unsuspected presence of bladder calculus, improper sutures, inadequate postoperative care in preventing sepsis and bladder distention and failure to remove entirely certain nonabsorbable suture material, such as silver wire. It is extremely important that thorough genitourinary studies be carried out as far as possible before treatment.

There were two operative deaths. The first patient, aged 53 years, had had a complete hysterectomy for cancer of the cervix in April, 1915. A fistula was unsuccessfully repaired in January, 1916. She died of pyonephrosis in May, 1916, 58 days after a second operation with satisfactory closure. The second patient, aged 35 years, had had an unsuccessful repair of her vesicovaginal fistula 6 months before admission. A second repair from below at this clinic was of no benefit. In April, 1931, an attempt to close the sinus by the abdominal route was a failure. There was excessive scarring and the approach was difficult. She died in November, 1931, during a second attempt at closure abdominally.

**Results.** Despite conscientious efforts to obtain complete follow-up data, there is no further information on 32 cases which were cured at the time of final discharge more than 1 year ago. The majority of these were treated before 1916. Forty-five other cases, however, cured on discharge and followed from 1 to 30 years remained cured. The second case in the bladder calculus group developed a new fistula between 12 and 16 months after being discharged cured. This is the only known instance in the series of a change in the discharge result. From this evidence it seems fair to consider that the majority of those cured on discharge stay cured. In cases of operative failure, leakage invariably recurs within 10 weeks.

**Division I.** Twenty-eight patients had undergone one to seven previous attempts at closure before admission—in all 61 operations, of which 4 were suprapubic (average = 2.2 operations per case). These patients had 40 more operations at this clinic. Unsuccessful repairs tend

to augment not only the difficulty of later operation but also the chances of a poor result, because of an increase in scar tissue and tension. However, as will be pointed out below, failures should not cause despair since success so frequently follows repeated attempts. The results in this group are summarized as follows:

Operative death during third attempt (abdominally)	1
Cured on discharge	6
Cured one to two years later	2
Cured two to fifteen years later	9
Fistula cured but functional incontinence two and six years later	2
Cured three, eight and thirteen years after second operation	3
Fistula cured but urethra incompetent six years after second operation	1
Fistula closed but urethra incompetent two years after third operation	1
Failures—no further operation	2
Failure (third case under bladder calculus)	1
Primary cures	19 67.3 per cent
Final cures	24 85.7 per cent

One patient had one normal delivery subsequently and later gave birth to premature twins without complication. Another had three normal deliveries without further mishap.

**Division II.** Sixty-one cases untreated before admission underwent 85 operations (average = 1.38 operations per case). The results in this group are summarized as follows:

Cured on discharge	24
Cured one to two years later	4
Cured two to over ten years later	17
Cured on discharge after second operation	2
Cured two years after second operation	1
Cured eighteen years after third operation	1
Cured on discharge after fourth operation	2
Cured on discharge after sixth operation	1
Failures—no further operation	5
Failures—after two attempts	2
Failure—after three attempts	1
Failure—after five attempts (second calculus case)	1
Primary cures	45 73.7 per cent
Final cures	52 85.2 per cent

Three patients had one normal delivery each and one had two deliveries without complication. A fourth patient had one miscarriage and one premature birth, a fifth, one miscarriage.

**Division III.** The results in 11 cases with fistulas caused by cancer of the cervix or its treatment are as follows:

Operative death following second attempt	1
Cured on discharge	3
Cured until death two years later	1
Cured until death four years and six months later	1
Cured fifteen years later	1
Recurrence due to disease three months later (1892)	1
Cured until death two years after second operation	1
Failures	2
Primary cures	7 63.6 per cent
Final cures	8 72.7 per cent

cause of adhesions Vaginal leakage ceased completely following this procedure Intravenous pyelography demonstrated normal function of the right and no function of the left kidney At the next operation the vesicovaginal septum was opened and a stone one half inch in diameter previously thought to be tumor was taken from the region of the left ureteral opening Two months later the left kidney and part of its ureter were removed for hydronephrosis and hydroureter The patient's last operation 15 months from the time of nephrectomy consisted of a perineorrhaphy because of anal incompetence At her latest examination, 10 years after her first admission and 3 years following perineal repair, her seventeenth operation she was well with the exception of occasional slight anal incontinence Her superfluous bladder with its opening into the vagina was giving no symptoms This case also is included among the failures but it is likely that the patient would have been cured sooner and undergone less suffering had the early attempts at closure been undertaken by the vaginal route

*Operative technic* By the Sims' operation is meant a simple oval denudation by the vaginal approach which extends to the bladder mucosa The edges are trimmed to permit approximation without interference by epithelium Scar tissue is excised or mobilized as much as possible Accurate approximation without tension is the important aim One should not fear making the opening larger during this procedure, for it does no harm Fistulas of small caliber are more likely to heal if considerably enlarged, probably because the dissection is certain to remove all scarred and inflamed tissue In placing interrupted sutures of silver wire, all layers of the vesicovaginal septum except the bladder mucosa are included

In cases where the loss of tissue and scarring are greater and where approximation is more difficult, an incision is carried around the opening, and the bladder and vaginal walls are separated from each other until the edges of the bladder opening can be drawn together without tension, using a fine tanned catgut suture The vaginal opening is closed with a row of interrupted sutures This is essentially the Braquehay method except that in the latter the sinus is dissected out in a collarette and inverted into the bladder

If the fistula is close to a ureter the introduction of a catheter into the ureter is a great help in placing the sutures so that they will not include the ureteral wall The needle is inserted with much more confidence and there is no skimping of the bite on one side for fear that it may include the ureter

It is sometimes necessary to resort to plastic manipulations such as rotating a flap of vaginal mucosa to fill in a defect Rarely, the location of the sinus makes closure by the abdominal route more feasible In this series the following types of operation were performed Sims—99, Braquehay—24, plastic—11, abdominal repair—2, implantation of left ureter into blad-

der—1 and transplantation of right ureter into sigmoid—1 This made a total of 138 operations, of which 38 were repeats Ureteral implantation into the bladder was done for uretero vaginal fistula following complete hysterectomy for cancer of the cervix Convalescence was normal and the patient had had no recurrence at death, 4 years and 6 months after implantation Ureteral transplantation into the sigmoid was performed recently for a right ureterovaginal fistula Convalescence was satisfactory and the patient discharged cured She had undergone radical hysterectomy in November, 1935, for an early carcinoma of the cervix complicated by chronic pelvic inflammation with a 15 centimeter simple serous cyst of the left ovary Following hysterectomy an abscess developed in the right side of the pelvis This discharged into the bladder Soon afterward, vaginal leakage of urine occurred Scarring made implantation of the ureter into the bladder impossible

Although advised by Sims and frequently mentioned in the literature, the use of silver wire in the repair of urinary fistulas is often ignored At this clinic it is considered one of the most important factors in achieving a cure The wire is placed in interrupted sutures and includes a good bite of all tissues to the bladder mucosa It gives good support, does not tend to cut through and causes little or no irritation Some have thought that it may form an antiseptic silver salt on contact with tissue juices and urine It is left in for at least 3 and usually 4 to 6 weeks At present silver-plated copper wire (no 26) is employed It is placed by the use of curved needles of suitable size carrying white braided silk leaders (nos 8 to 11) The tissues are approximated without constriction by twisting the wire on itself The ends are cut and shot with lead A record is kept of the number of sutures used and this number should be accounted for at the time of removal The importance of removing all silver wire is suggested by the first of the bladder calculus cases in which retained silver wire was found associated with stone and a new fistula It is also demonstrated by the following resume of a case in this series

Mrs E E H on admission had already undergone two attempts at repair A third repair seemed successful and her vagina was dry 8 weeks after operation when nine and one-half instead of ten silver stitches were removed Two and one-half years later she returned because of constant slight leakage since discharge A 0.5 millimeter sinus was found near the upper end of the vaginal scar and just above the scar was a 2 millimeter fistula in which was attached the other half stitch She has now been cured for over 8 years since the fourth operation which probably should not have been necessary

The desideratum of postoperative care is to avoid tension on the sutures Constant drain



age is maintained either by a plain tipped soft rubber catheter held by adhesive strips or by a small indwelling silver catheter. These should be watched constantly to make certain they do not become plugged. The bowels are kept open. After the third postoperative day gentle douches of sterile boric acid solution are given. The catheter is removed between the ninth and fourteenth days and the patient allowed up after the fourteenth day. Removal of the sutures is carried out in the operating room with anesthesia, unless they can be easily exposed.

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Cured two years after second operation	1
Cured eighteen years after third operation	1
Cured on discharge after fourth operation	2
Cured on discharge after sixth operation	1
Failures—no further operation	5
Failures—after two attempts	2
Failure—after three attempts	1
Failure—after five attempts (second calculus case)	1
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Cured fifteen years later	1
Recurrence due to disease three months later (1892)	1
Cured until death two years after second operation	1
Failures	2
Primary cures	7 63.6 per cent
Final cures	8 72.7 per cent

Thus, of 100 treated cases, 71 were cured by one operation at this clinic and 84 were final cures. None of the surviving uncured patients were made worse by treatment. On the contrary, 2 were markedly improved. There were four instances in which urinary incontinence persisted to an annoying degree even after satisfactory healing of the fistula. It is not unlikely that the mechanism of sphincter control may have been upset from previous trauma, scarring and lack of use, for in these cases the urethra was not unduly patulous and, furthermore, plastic operations which ordinarily benefit functional incontinence were of little help. Six other patients had varying degrees of functional incontinence but none seemed sufficiently incommode to demand repair. The insertion of a pessary completely relieved 1 of these. Another patient reported complete control within a few months after operation. A third regained complete control by the end of the second postoperative year.

**Discussion** In general it would seem wise not to attempt repair of fistulas as soon as they have been incurred. An occasional one will heal spontaneously, especially if there is some evidence of retention. Fistulas should not be repaired while the patient is nursing, because the so called lactation atrophy of the genital organs, with their reduced blood supply, may not be conducive toward healing. Failures may be due to eagerness on the part of the surgeon to relieve the patient from her distressing condition instead of waiting for a favorable time to operate. In cases of fistula due to irradiation, operation should not be undertaken until the tissues have had plenty of time to recover from the effects of treatment—at least a year after the development of the sinus.

Although there has been no experience at this

clinic with the transvesical repair of fistulas through a suprapubic cystotomy, the risks and disadvantages of this procedure are considered too great to warrant its use. Rarely one is compelled to operate transperitoneally, as happened in one of the above cases in which the fistula opened high up in the endocervix and in another in which the depth of the vagina and the scarring made approach from below technically impossible. Operations from below incur no great risk and convalescence tends to run smoothly.

There seems to be an increasing trend, especially among urologists, toward transplanting the ureters into the intestine in cases of vesicovaginal fistulas with large openings or of those apparently inaccessible ones located at the top of the vagina, as after complete hysterectomy. No attempt at repair should be made until all induration has gone and the tissues are as flexible as they are going to be. Then it is not uncommon to find that the bladder wall can be drawn down with comparative ease and a direct attack made. No definite rules can be laid down regarding transplantation of the ureters but, if the fistula can be reached and its edges drawn together through the vaginal approach, the much more dangerous operation is unnecessary.

Since 13 cases were finally cured after two to six operations, one should not become discouraged if one attempt results in failure.

#### SUMMARY

One hundred treated cases of urinary fistula opening into the vagina have been reviewed as to type, size, cause and complicating factors.

Cases of spontaneous closure and those with bladder calculus have been cited.

The management, operative technic, errors and causes of failure have been considered and the results presented. Final cures were 84 per cent.

## MOULDED PLASTER RIGHT ANGLE ELBOW SPLINTS

BY PAUL R. WITHINGTON, M.D.\*

**T**HOSE who have used anteroposterior moulded plaster splints for the immobilization of Colles' fractures know how satisfactory they are. They may be applied without danger of subsequent slipping, are comfortable, and, since they conform to the soft parts, are unlikely to produce pressure sores. However, when the fracture is of the middle or upper third of the forearm, it is, of course, necessary to immobilize the elbow joint. To do this one must, in addition to the anteroposterior splints, use an internal angular splint of tin. Not only does this make a bulky dressing, but it also requires

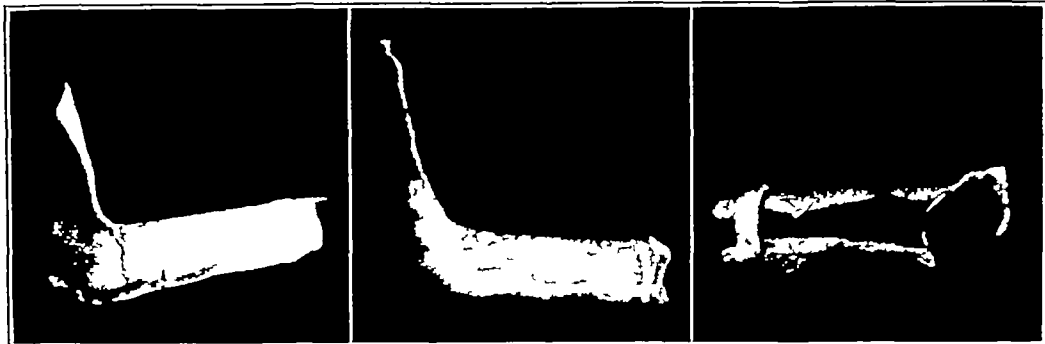
that the doctor have on hand a large collection of different sized splints. The alternative is to apply a circular plaster of Paris splint. In the application of this, one is apt to lose a previous good reduction due to the repeated shifting of the bandage from hand to hand. Another disadvantage is that the cast may have to be split (if swelling occurs) or renewed (if, as swelling goes down, mobility of the fragments occurs). A strip of plaster laid out at right angles will not, when applied to the elbow, hold the joint motionless because of the play allowed by the soft tissues about the upper arm.

In order to obtain the advantages of the moulded plaster splints for this type of frac-

\*Withington, Paul R.—Clinical Assistant Physician, Children's Hospital. For record and address of author see "This Week's Issue" page 1182.

ture, and at the same time to offset the disadvantage of the superimposed internal angular splint, it occurred to me that if, instead of laying the plaster out at right angles, it were laid

The advantages of the splints are as follows  
1 Lightness and compactness  
2 Less chance of losing a good position due to shifting of hands during application



Anterior splint Rt.  
(internal view)

Posterior splint Rt.  
(external view)

Both splints arranged as though  
in position (from above)

out at a slightly acute angle (for the anterior splint) and at a slightly obtuse angle (for the posterior one), the ends would, on application curl around to the anterior and posterior respectively, of the upper arm, thus holding the elbow firm. This utilization of the third dimension solved the problem, the splint here pictured, resulted

3 Less chance of pressure sores, ease of accommodation to increase or diminution of swelling of the arm.

4 Ease in the dressing of compound fractures

5 Does away with the need of a large assortment of tin internal angular splints

6 Toward convalescence the splints may easily be trimmed to a smaller size

#### COURT DECISION ON PUBLIC HEALTH

Tuberculosis contracted by employee in business of manufacturing women's dresses because of conditions of employment, held not compensable as occupational disease under workmen's compensation act—(Connecticut Supreme Court of Errors *Madeo v I Dlbner & Bro., Inc., et al*, 186 A. 616 decided July 30 1936) An employee in the business of manufacturing women's dresses claimed compensation under the Workmen's Compensation Act for disability due to pulmonary tuberculosis. The finding disclosed that the tuberculosis from which she suffered was contracted because of conditions of employment. The commissioner awarded compensation but the trial court sustained the appeal of the defendants, and the plaintiff appealed to the supreme court of errors.

The compensation act defined a personal injury as including occupational disease which in turn, was defined as a disease peculiar to the occupation in which the employee was engaged and due to causes in excess of the ordinary hazards of employment as such.

The supreme court quoted from a prior case in which it had said that to come within the definition an occupational disease must be a disease which is a natural incident of a particular occupation and must attach to that occupation a hazard which distinguishes it from the usual run of occupations and is in excess of that attending employment in gener

al Regarding this definition the court in the instant opinion stated that 'It does not include a disease which results from the peculiar conditions surrounding the employment of the claimant in a kind of work which would not from its nature be more likely to cause it than would other kinds of employment carried on under the same conditions' "In this case said the court, 'the plaintiff's disease resulted from the conditions of her particular employment in the factory of the defendants. Other trades carried on under those conditions would have been as likely to cause the disease as the manufacture of dresses

The action of the trial court in denying compensation was sustained—*Public Health Reports*, October 30 1936

#### FOOD AND DRUG PENALTIES COVER VARIETY OF OFFENSES

Fines imposed in cases brought under the Federal Food and Drugs Act during October ranged from \$1 and \$2 up to \$300 and \$500 the Food and Drug Administration reports. The total of fines assessed was \$2 563.

Criminal prosecutions were based on decomposed or otherwise questionable foods and a variety of fraudulent preparations of drugs—*U S Department of Agriculture*

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT M D

TRACY B MALLORY, M D, *Editor*

CASE 22511

## PRESENTATION OF CASE

A 22 year old college girl was admitted complaining of pain in the abdomen, and backache. The patient had been well until the day before entry when, following a large noonday meal, she developed vague upper abdominal pain and backache. The pain was not severe and was not associated with nausea or vomiting. That evening her appetite was poor and she ate but little for supper. She took a cathartic shortly before going to bed and subsequently had four bowel movements between 2 and 4 a m. She slept poorly and her abdominal discomfort during the night shifted to the upper abdomen and both lower quadrants of the abdomen. On arising on the day of entry the patient had a light breakfast following which she was nauseated and vomited once. She went to her first class but had sufficient malaise so that she then went back to bed. The patient felt slightly feverish but there was no further vomiting or diarrhea. Her backache was not the same in character as she occasionally had with her menses. It was not localized to one area but extended generally across her back below her twelfth ribs. Equal discomfort was experienced on both sides. Her abdominal discomfort persisted with much the same intensity as when first noted.

The menses had begun at the age of 13 and were regular every 28 days with a duration of 6 days. The last period was 2 weeks prior to entry. There had been no previous illness of significance or any attack similar to the present illness.

Physical examination showed a well developed and nourished young girl lying quietly in bed in only slight discomfort. Save for her abdominal and pelvic findings, no abnormalities were noted on general examination. Her abdomen was not distended. Peristalsis was somewhat diminished but when heard was normal in quality and pitch. Liver dullness was not obliterated and the liver edge could not be felt. On palpation there was some tenderness in the midline just above the umbilicus, extending some-

what into the right upper quadrant. There was also slight tenderness in the right lower quadrant. There was but slight involuntary muscle spasm associated with the tenderness in these two areas. The left lower quadrant and the left upper quadrant were not tender. The tenderness in the upper part of the abdomen was definitely more marked than that in the right lower quadrant. No well-defined regional tenderness was elicited. Pelvic examination showed the pelvic organs to be normal in size and position. There was definite but slight tenderness in the left vault. No mass was felt. No leukorrhea was present. Rectal examination added nothing further to the pelvic findings.

The temperature was 100°, the pulse 120. The respirations were 20.

Examination of the urine showed a specific gravity of 1.020. There was no albumin or sugar, but a positive reaction for diacetic acid and acetone was obtained. A later urine examination was negative. Examination of the sediment was negative. The blood showed a white cell count of 15,500, 85 per cent polymorphonuclears.

A flat x-ray plate of the abdomen showed no abnormalities.

Shortly after entry a laparotomy was performed. A noninflamed appendix folded at the junction of its distal and middle thirds was exposed. This thickened area of the appendix was twice the size of a normal appendix and was firm in consistency. Further exploration showed a mass the size of a golf ball in the midline retroperitoneally, just below the transverse mesocolon.

## DIFFERENTIAL DIAGNOSIS

DR ROBERT R LINTON. I think it is fair to say that, from the history as it is given us here, we are dealing with what may be called an acute surgical abdomen. Certainly when anyone of this age presents such a story beginning with vague upper abdominal pain which shifts to the right lower quadrant, followed by nausea and vomiting, and which is associated with a slight amount of temperature, an elevated pulse and a white cell count of 15,500 with 85 per cent polymorphonuclears, the most likely thing we think of is acute appendicitis. I would hazard a guess that that was the preoperative diagnosis. However, there are certain things which are not usual in this story and one of these is the fact that she complained of backache. I think that is very unusual in appendicitis. Apparently it was present on both sides of her back. The other thing that is a little unusual for appendicitis is the very bizarre arrangement of the tenderness in the various quadrants as it is described here. I am a little hazy as to exactly where the maximum

tenderness was, but I will assume that it was a little above the umbilicus and a little to the right. That is unusual in appendicitis but it certainly could occur there.

I presume the x-ray was taken to rule out any possibility of kidney stone, as that probably was considered because of the pain in the back. I think the facts that she had no urinary symptoms, that the urine was negative, and that the x-ray plate showed no shadows, rule out her genito-urinary tract as a cause of her symptoms.

I became more confused as I read the description of the appendix. I am a little bit in doubt as to why I was given this additional information about the appendix.

DR TRACY B. MALLORY: I thought I would like to put the question up to you exactly as it was put to the surgeon at 2 a. m. He resected this thickened appendix, opened it, and found the distal two-thirds completely solid. He felt a mass retroperitoneally. What was he dealing with? And what was he to do? There was no pathologist available at 2 a. m. to tell him what to do!

DR LINTON: There are other possibilities which must now be considered rather than acute appendicitis. In the first place, there is a condition which is called carcinoid which, as I understand it, is a tumor-like condition of the appendix which usually involves the distal end and which on gross and microscopic examination suggests a carcinoma. The strange thing about it, as I understand it, is that, in spite of its microscopic similarity to carcinoma, it never metastasizes. It is a relatively benign growth and whether it spreads locally or not I am not very sure, but at least I do know that it is not supposed to metastasize.

Another possibility is that we might have a true carcinoma of the appendix. I think that is a very rare condition and for that reason alone I would rule it out as a probability, despite the fact that she had this mass in the retroperitoneal region.

There is another condition that is called mucocoele of the appendix which usually involves the distal portion. It is not a solid tumor but a cyst containing mucus. It may or may not be locally malignant. There are two other conditions which are infectious in nature which one might think of. One is tuberculosis and the other actinomycosis. It is fair to say concerning these two that the cecum is primarily involved and the appendix only involved secondarily to the cecum. The cecum was not involved in this case so I think we can rule out these two conditions. I feel that the pain in her back was explained undoubtedly by the finding of a mass in the retroperitoneal region. Just what connection that plays with this enlarged appendix I am not very sure. I feel that we

can say that it is probably a retroperitoneal gland that is enlarged due to some infection and I am going to assume that that infection is in the appendix. I think she does not have an acute appendicitis although there may be more or less subacute infection associated with the process she has there.

There is one other thing I did think of which I wish to mention, and that is Hodgkin's disease. I think the surgeon did right in removing the appendix, even though it was Hodgkin's disease. My final diagnosis is carcinoid of the appendix with mesenteric adenitis.

#### PREOPERATIVE DIAGNOSIS

Acute appendicitis  
Ruptured follicular cyst?

#### DR. ROBERT R. LINTON'S DIAGNOSIS

Carcinoid of the appendix with mesenteric adenitis

#### PATHOLOGIC DIAGNOSIS

Carcinoid of the appendix with metastasis to a retroperitoneal lymph node

#### PATHOLOGIC DISCUSSION

DR. MALLORY: I am sorry Dr. Faxon is not here to tell you his own impressions in the case. He first removed the obviously abnormal appendix and then, as I said, cut into it and proved to his own satisfaction that there was a firm tumor in the distal portion. He next attempted to explore this retroperitoneal mass a little further. He put a needle into it but was unable to extract anything. He considered the possibility of dissecting it out without knowing what it was, but since it was in intimate contact with the inferior mesenteric artery he thought that was a good deal of risk to take, not knowing what he was dealing with so he eventually took a small biopsy and then backed out.

The histologic sections of the appendix showed a typical carcinoid and the biopsy from this retroperitoneal node showed the same thing. Carcinoids are tumors of relatively very low malignancy but they are not entirely benign tumors. It is quite true that carcinoids in the appendix, the commonest site for them very rarely metastasize, but carcinoids also occur in the lower ileum and those not so infrequently do metastasize. We have had three ileac carcinoids with frank metastases and we have had nearly a dozen with marked deep invasion of the wall of the ileum. Even when these tumors do metastasize their growth is very slow. We have one particularly interesting case of primary carcinoid of the ileum which Dr. Daniel Jones resected. The man died 15 years later of some entirely different condition, yet at post-mortem examination we found a lymph node

containing carcinoid in the retroperitoneal tissues. Metastasis had occurred but it had not spread beyond that single lymph node in the course of 15 years. On that basis Dr Faxon decided that it was worth while to go back again in this case, which he did the day before yesterday, and was able to remove the single enlarged gland without much difficulty. I think the possibility of cure in this case is fairly good, and even if she is not cured I expect she will have a number of years of good health.

A PHYSICIAN Do they respond to radiation?

DR MALLORY I do not believe anybody knows. They are sufficiently uncommon, and metastasis is so rare that I do not believe anyone has, wittingly, ever treated metastatic carcinoid.

A PHYSICIAN How do you correlate the clinical finding with the finding at operation?

DR MALLORY I cannot explain all the shifts of pain. I would be inclined to agree with Dr Linton that the back pain was due to the retroperitoneal mass. We know that tumors of the pancreas very commonly produce back pain and I think that was the one lead in the clinical history possibly pointing to this diagnosis.

DR THOMAS V URMY How do you explain the acute symptoms?

DR MALLORY I have no answer for that.

A PHYSICIAN Do you think it was infectious?

DR MALLORY No.

A PHYSICIAN How do you recognize a carcinoid?

DR MALLORY That is hard to answer off-hand. To anyone who has seen carcinoids, one glance with low power tells you it is carcinoid and not carcinoma. The cellular pattern is quite different. If you want more than that, you have to resort to elaborate technical methods. Masson has proved that carcinoids are not tumors of epithelial cells but tumors of nerve end organs in the lower intestinal tract and that they contain cells which react with silver, in other words, they are argentaffin-cell not epithelial tumors.

## CASE 22512

### PRESENTATION OF CASE

A 24 year old unmarried American stenographer was admitted complaining of pain in the abdomen.

The patient had been perfectly well until 3 days before entry, when she was awakened at 5 00 a m by severe lower abdominal pain which was steady in character. She was given an enema which caused the pain to become worse and she fainted. After returning the enema, however, she felt better although there was residual steady pain in the right lower quadrant and some tenderness persisted without abate-

ment until admission. There were no chills, nausea or vomiting. She had vomited twice about a week before entry after an evening meal, but there was no associated nausea or malaise at that time.

Five or six years ago there had been an attack of lower abdominal pain almost as severe as the current illness. During the interval, however, there had been no discomfort. The catamenia was said to have been irregular in that occasional amenorrhea occurred for 2 or 3 months. There was no menorrhagia, metrorrhagia or dysmenorrhea. The last menstrual period began 9 days before admission and lasted 5 days.

Physical examination showed a well developed and nourished young woman in no apparent discomfort. The heart and lungs were normal. The lower abdomen was slightly distended and there was moderate tenderness and spasm in the right lower quadrant. Peristaltic sounds were normal and there were no palpable masses or costovertebral tenderness. Pelvic examination showed the fundus to be normal in size and position. It was freely and painlessly movable. Neither vault was tender but rectal examination revealed tenderness on both sides.

The temperature was 99°, the pulse 102. The respirations were 24.

Examination of the urine was negative. The blood showed a white cell count of 17,000.

Shortly after entry a laparotomy was performed.

### DIFFERENTIAL DIAGNOSIS

DR HORATIO ROGERS This sudden onset in a young woman who was previously well, with a story of 3 days of abdominal pain in the right lower quadrant, would make one think first of appendicitis. That is by far the commonest cause of pain in the right lower quadrant. Secondly, one would think of an ectopic pregnancy. Next would come twisted ovarian cyst, ruptured follicular cyst, and possibly acute salpingitis or chronic pelvic inflammation, in about that order of likelihood. The picture does not exactly fit any of these diagnoses, however. There are several hints that would lead us to consider ectopic pregnancy. For instance, the fact that she fainted in the first attack of sudden pain. It was sudden because she woke up with the pain, having felt all right the previous evening. She had vomited twice the week before for no apparent reason, possibly a suggestion that she may have been in the early stages of pregnancy. Her catamenia is said to have been irregular in the past but it is stated with authority that her last period started 6 days before the onset of symptoms and had just ended the day before. But we cannot be sure that that was really her period. It may have been a little abnormal.

uterine bleeding accompanying an ectopic pregnancy. No mass was felt on pelvic examination in either vault. The uterus is stated to have been normal in size, that is, normal for a non-pregnant uterus, and in an ectopic, of course, the uterus would be the same size that it would be in an intrauterine pregnancy of the same duration. I think that those are points which we cannot twist around, and on that evidence I do not think that we can make a diagnosis of extrauterine pregnancy.

As to acute salpingitis or pelvic inflammation, there is very little to go on and there is one fact which absolutely rules them out. The uterus was freely movable, with no pain and no tenderness in either vault on vaginal examination.

A ruptured follicular cyst has a sudden onset with pelvic tenderness. There is no vomiting here, which she would have been likely to have if it had been a ruptured follicular cyst. Pain and tenderness persisted for three days in her right lower quadrant and when she came into the hospital there was spasm on the right but not on the left. I think we have to visualize what was going on for the 3 days before she entered the hospital. In that time we would expect blood to have spread across the pelvis and the symptoms to be bilateral instead of unilateral, as far as pain and tenderness are concerned. But in this girl all the symptoms stayed on the right side for 3 days. What the rectal tenderness on both sides was, I do not know, but I am hoping it was not very important and may not be an accurate observation. Furthermore, ruptured follicular cyst should have happened halfway between her periods. This episode happened 6 days after the onset of her last period or just 8 days too soon for the usual ruptured follicular cyst. If she was ovulating in a normal rhythm, as presumably she was if she was menstruating in a normal rhythm, then one would probably be wrong in diagnosing follicular cyst.

As regards twisted ovarian cyst, there was a sudden onset but there is not enough evidence to make the diagnosis on pelvic or on abdominal examination. She did not seem to have become progressively worse as this story is told. I get the idea that she is not very sick.

Appendicitis the commonest lesion statistically, as an explanation for this picture has a few things wrong as a diagnosis in this case. She did not begin with pain in the epigastrium or generalized pain. It was localized in the right lower quadrant from the beginning. She

was awakened with sudden pain instead of having prodromal symptoms of something getting worse and worse. This story of vomiting twice a week before onset and being perfectly well in between is certainly not at all characteristic of appendicitis and why she vomited the week before, I have not the faintest idea. There were previous attacks of something 5 or 6 years ago which may have been attacks of appendicitis but nothing is said to give us any help on that. Her temperature and white count are compatible with acute appendicitis. The rectal tenderness is compatible with pelvic appendicitis and the absence of vaginal tenderness is compatible. So that although we have to be prepared to be wrong in the diagnosis, I think there is no question as to what this treatment should be. It is obviously something that requires operation, and it is probably acute appendicitis in the pelvis.

#### CLINICAL DIAGNOSIS

Subsiding appendicitis

#### DR HORATIO ROGERS'S DIAGNOSIS

Subsiding pelvic appendicitis

#### PATHOLOGIC DIAGNOSES

Follicular cyst of the ovary with rupture  
Healing appendicitis  
Parovarian cyst

#### PATHOLOGIC DISCUSSION

DR MALLORY. The house officer who operated on this case has finished his service, so I will have to describe his findings from the records. As he approached the region of the pelvis he found large amounts of blood on both sides, some old and clotted, some fairly fresh. The appendix was retrocecal and entirely out of the picture. The left ovary contained a fairly large ruptured follicular cyst. There was nothing present in the right ovary and I think there is no question that a ruptured follicular cyst with hemorrhage was the cause of her symptoms. It is strange, first that it should have occurred at this very early period of the cycle, and, secondly, that since the cyst was in the left ovary that from beginning to end, her symptoms were on the right.

DR RALPH ADAMS. I saw that operation and it explains the right lower quadrant symptoms if one knows that the left ovary lay behind and to the right of the uterus.

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## A CHRISTMAS MESSAGE

As the swift seasons roll, we arrive, more or less automatically, at that particular stage of the annual cycle when we begin to wonder what Saint Nicholas has in the bag for us. We in our own profession and, we are told, those outside of it as well have become somewhat accustomed in the last few years to receiving prize packages, not always of pleasant content and not always coming at the merry Yuletide.

If we are philosophically minded, those jabs in our various tender spots have served after a sort to immunize us against adverse social or economic substances, if we are of a type destined to make us the sports of Fate we have become sensitized, which is a different and less pleasant matter. In this sadder case succeeding injections serve only to arouse reactions undesirable in their nature and still more irritating in their effects. Who, after all, wants to become allergic to environmental conditions over which he has no control, or exhibit only reac-

tions of sensitivity to circumstances which he is capable of improving?

Such thoughts, however, savor of a paternal if not, indeed, a didactic philosophy and are undoubtedly a little too deep for your mere editorial writer to toy with. As Confucius might have said, he who cannot swim must wade, and waders should stick to shallow water unless they want to get wet all over, and that bottoms up. Moreover, the *Journal*, despite its hundred odd years of observation of matters medical (and animal and vegetable and mineral, as those who have lived through the Gilbertian era might be tempted to put it) does not yet feel itself of an age to attempt either pulpit preachment or peripatetic pedagogy.

What we meant to say was that there are certain gifts in the bag of Saint Nicholas for all of us if we will reach in and pull them out, and rather than three wise men bringing gifts there will be many receiving them. There is the gift of silence when mere words are superfluous—an inexhaustible gift for all who would make use of it, there is the gift of sympathy and kindness toward those who are dependent upon us for good cheer in times of trouble, there is the gift of fairmindedness and ethical consideration toward our colleagues, there is the gift of holding a respected place in a profession respected above all others, and increasing the respect in which it is held among the multitudes of all nations.

With such gifts at our disposal we cannot fail to enjoy the Merry Christmas and the Happy New Year which the *Journal* wishes to its goodly company of readers.

## ANNUAL REGISTRATION OF PHYSICIANS

THE Board of Registration in Medicine has again advocated the re-registration of physicians and has introduced a Bill providing that such registration be required annually. The Bill differs in two respects from that introduced last year, namely, in making the fee one dollar instead of two, and in characterizing and limiting the information about the physician which the Board may require and publish. The purpose of the information is to identify the physician, but not in every respect. It is merely in his professional capacity, so that his registration number, his professional address, his medical education, his field of practice (specialty) and special method of treatment employed, if any (Homeopathy, Osteopathy, Eclecticism or other system), are all pertinent and may be helpful to the lay person seeking information about a physician to the end that he may be well informed when he makes his choice. Whether he chooses more wisely is another question.

Why is such a bill advocated? As was stated



last year, the Board of Registration in Medicine acting under the statute registers physicians and preserves its register of names which is a matter of public record. No provision is made under the existing statute for revising the register from time to time. The only information concerning a registered physician that comes to the Board (after the Town Clerk notifies the Board as to the local registration) is on complaint or on enquiry, as from an insurance company or credit agency or some other interested person. If the physician dies, only by chance does the Board learn of his cessation of practice.

The purpose of the Bill, then, is first to provide an accurate and up-to-date register of duly licensed physicians practicing in the Commonwealth, and, secondly, to make this register easily available by publishing copies for distribution throughout the State.

Is such a list of practical value? Certainly the publication of the list is no guarantee that it will be used, but the results in states where such a list is widely distributed indicate that people really do want to know more about the qualifications of their physicians and if they know that a person is not registered by the state, they are less likely to seek his professional assistance. According to the experience of other states many of the unlicensed practitioners of medicine voluntarily leave promptly when such a bill, as is advocated for Massachusetts becomes law.

Are there then no objections to the Bill? There are indeed objectors and they give several reasons. The first objection is on the ground of unconstitutionality, but although such laws have been on the statute books of nearly twenty states, in some states for a number of years, the question has never been brought into court for decision, and legal opinion is against objection on the ground of unconstitutionality.

The second objection is on the part of some members of the medical profession who as they express it, resent a tax on reputable physicians designed to employ the police in doing what they ought to do anyhow. An additional tax on physicians is not to be advocated with the glib assurance that the doctor is always ready to help any good cause. But these objectors fail to distinguish between the "police" and the "police power of the state". The whole work of the Board of Registration in Medicine (except in so far as it may be incidentally educational) is under the police power of the State while it is clearly not under the police. The main purpose of such exercise of the police power of the State as would be involved in carrying out the provisions of the bill would be educational in disseminating correct information throughout the State concerning registered physicians. Incidentally it would show up by

contrast persons not licensed, who would be the more easily compelled to become registered if qualified, or to leave the State if they desired to continue in their practice without registration, or to desist from practice if they continued to reside in Massachusetts.

The economic side is not too unimportant to be mentioned. The cost of registration might be seven thousand dollars a year for the whole medical profession. It has been estimated that there are a thousand persons in Massachusetts practicing medicine in some form without being licensed. The enlightenment which would come from having an authoritative list of licensed physicians (a legitimate form of advertising) easily accessible in all parts of the State, might reasonably be expected to deflect an amount of money at least equal to the cost of registration into the depleted moneybags of the medical profession.

The text of the bill is appended.

AN ACT providing for the Annual Registration of Physicians and the Annual Publication of the List of Physicians duly registered

Section 1 Chapter one hundred and twelve of the General Laws, as appearing in the Tercentenary Edition thereof is hereby amended by inserting after section four the two following new sections —

Section 4A Every person registered by the board as a qualified physician, who is engaged in the practice of medicine within the commonwealth, shall annually in December renew his registration for the ensuing calendar year by payment of one dollar to the board and recording with the board his name, his registration number, his professional address, and such other identifying information concerning his medical education as the board may require, together with the field of his practice, including the special system of treatment employed, if any, on blanks furnished by the board at the request of the physician and signed by him under the penalties of perjury, and thereupon the board shall issue to him a certificate showing that he is entitled to continue in the practice of medicine for the period covered by said renewal. Whoever, being duly registered under section two or corresponding sections of earlier laws practices or attempts to practice medicine without complying with the requirements of this section, shall be punished by a fine of not less than five nor more than one hundred dollars.

Section 4B On the first day of March of each year, the Board shall publish a list of the physicians who, in compliance with the provisions of section two or section four A, as the case may be, are authorized

# The New England Journal of Medicine

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## A CHRISTMAS MESSAGE

As the swift seasons roll, we arrive, more or less automatically, at that particular stage of the annual cycle when we begin to wonder what Saint Nicholas has in the bag for us. We in our own profession and, we are told, those outside of it as well have become somewhat accustomed in the last few years to receiving prize packages, not always of pleasant content and not always coming at the merry Yuletide.

If we are philosophically minded, those jabs in our various tender spots have served after a sort to immunize us against adverse social or economic substances, if we are of a type destined to make us the sports of Fate we have become sensitized, which is a different and less pleasant matter. In this sadder case succeeding injections serve only to arouse reactions undesirable in their nature and still more irritating in their effects. Who, after all, wants to become allergic to environmental conditions over which he has no control, or exhibit only reac-

tions of sensitivity to circumstances which he is capable of improving?

Such thoughts, however, savour of a paternal if not, indeed, a didactic philosophy and are undoubtedly a little too deep for your mere editorial writer to toy with. As Confucius might have said, he who cannot swim must wade, and waders should stick to shallow water unless they want to get wet all over, and that bottoms up. Moreover, the *Journal*, despite its hundred odd years of observation of matters medical (and animal and vegetable and mineral, as those who have lived through the Gilbertian era might be tempted to put it) does not yet feel itself of an age to attempt either pulpit preachment or peripatetic pedagogy.

What we meant to say was that there are certain gifts in the bag of Saint Nicholas for all of us if we will reach in and pull them out, and rather than three wise men bringing gifts there will be many receiving them. There is the gift of silence when mere words are superfluous—an inexhaustible gift for all who would make use of it, there is the gift of sympathy and kindness toward those who are dependent upon us for good cheer in times of trouble, there is the gift of fairmindedness and ethical consideration toward our colleagues, there is the gift of holding a respected place in a profession respected above all others, and increasing the respect in which it is held among the multitudes of all nations.

With such gifts at our disposal we cannot fail to enjoy the Merry Christmas and the Happy New Year which the *Journal* wishes to its goodly company of readers.

## ANNUAL REGISTRATION OF PHYSICIANS

THE Board of Registration in Medicine has again advocated the re-registration of physicians and has introduced a Bill providing that such registration be required annually. The Bill differs in two respects from that introduced last year, namely, in making the fee one dollar instead of two, and in characterizing and limiting the information about the physician which the Board may require and publish. The purpose of the information is to identify the physician, but not in every respect. It is merely in his professional capacity, so that his registration number, his professional address, his medical education, his field of practice (specialty) and special method of treatment employed, if any (Homeopathy, Osteopathy, Eclecticism or other system), are all pertinent and may be helpful to the lay person seeking information about a physician to the end that he may be well informed when he makes his choice. Whether he chooses more wisely is another question.

Why is such a bill advocated? As was stated

GAMBLE, JAMES L. A.B., S.M., M.D. Harvard University Medical School 1910 Professor of Pediatrics, Harvard University Medical School Visiting Physician, Children's Hospital and Infants' Hospital, Boston His subject is "Extracellular Fluid and Its Maintenance" Page 1150 Address 300 Longwood Avenue, Boston, Mass

JONES, CHESTER M. B.A., M.D. Harvard University Medical School 1919 Assistant Professor of Medicine, Harvard University Medical School Physician, Massachusetts General Hospital Consultant in Medicine Newton Hospital His subject is "Protein Deficiency" Page 1152 Address Massachusetts General Hospital, Boston, Mass

HEATH, CLARK W. A.B. M.D. Harvard University Medical School 1926 Instructor in Medicine and Assistant Medical Adviser, Harvard University Medical School Assistant Physician, Thorndike Memorial Laboratory, Boston City Hospital His subject is "Mechanism of Hemoglobin Deficiency" Page 1155 Address 319 Longwood Avenue, Boston, Mass

CASTLE, WILLIAM B. M.D. Harvard University Medical School 1921 Associate Professor of Medicine, Harvard University Medical School His subject is "The Relationship of Defective Nutrition to Changes in the Gastrointestinal Tract" Page 1158 Address Boston City Hospital, Boston, Mass

WOLBACH, S. BURT M.D. Harvard University Medical School 1903 Shattuck Professor of Pathological Anatomy, Harvard University Medical School Pathologist, Peter Bent Brigham, Children's, Infants', and Boston Lying-in Hospitals His subject is "Vitamin C and the Formation of Intercellular Material" Page 1158 Address Harvard University Medical School, 240 Longwood Avenue, Boston, Mass

BLACKFAN, KENNETH D. M.D. Albany Medical College, Union University, 1905 Thomas Morgan Rotch Professor of Pediatrics, Harvard University Medical School Chief of the Medical Service, Children's Hospital Medical Director, Infants' Hospital, Boston His subject is "Progress in the Early Recognition of Vitamin Deficiency States" Page 1159 Address 300 Longwood Avenue, Boston, Mass

HOWE, PERCY R. A.B., D.D.S. Philadelphia Dental College 1890, D.Sc. Alexander Forsyth Professor of Dental Science Harvard Dental School Instructor in Pathology, Harvard University Medical School Director Forsyth Dental Infirmary for Children His subject is "Oral Pathology in Relation to Avitaminosis" Page 1163 Address 49 Cedar Road, Belmont, Mass

STRAUSS, MAURICE B. A.B., M.D. Johns Hopkins University School of Medicine 1928 Instructor in Medicine, Harvard University Medical School Research Fellow, Thorndike Memorial Laboratory, and Assistant in Medicine, Boston City Hospital His subject is "Nerve Disorders Arising from Defective Nutrition" Page 1164 Address 270 Commonwealth Avenue, Boston, Mass

JOSLIN, ELLIOTT P. B.A., M.A., M.D. Harvard University Medical School 1895 Clinical Professor of Medicine, Harvard University Medical School Medical Director, George F. Baker Clinic, New England Deaconess Hospital Consulting Physician, Boston City Hospital His subject is "Protamine Insulin and Its Advantages" Page 1166 Address 81 Bay State Road, Boston, Mass

PEMBERTON, FRANK A. S.B., M.D. Harvard University Medical School 1909 F.A.C.S. Clinical Professor of Gynecology, Harvard University Medical School Surgeon-in-Chief Free Hospital for Women, Brookline, Mass Address 198 Commonwealth Avenue, Boston, Mass Associated with him are

SMITH, GEORGE VAN S. A.B., M.D. Harvard University Medical School 1926 Visiting Surgeon, Pathologist and Director of Research, Free Hospital for Women and Fearing Research Laboratory, Brookline, Mass Research Fellow in Gynecology, Harvard University Medical School Address Free Hospital for Women, Brookline, Mass And

GRAVES, SIDNEY C. A.B., M.D. Harvard University Medical School 1929 Assistant Visiting Surgeon, Free Hospital for Women, Brookline, Mass Address 198 Commonwealth Avenue, Boston, Mass Their subject is "Urinary Fistulas Opening Into the Vagina" Page 1170

WITHINGTON, PAUL R. M.D. Harvard University Medical School 1916 Visiting Physician, Milton Hospital Clinical Assistant Physician, Children's Hospital President, Massachusetts Public Health Association His subject is "Moulded Plaster Right Angle Elbow Splints" Page 1174 Address 350 Randolph Avenue, Milton, Mass

### The Massachusetts Medical Society

NEW FELLOWS ADMITTED TO THE DISTRICT SOCIETIES IN NOVEMBER 1936

#### Berkshire

Beers Daniel Nichols 74 North Street Pittsfield

#### Bristol North

Seguin Wilfrid Adrien State Hospital Taunton

by the board to engage in the practice of medicine in the commonwealth during the current calendar year, giving the name of each registrant, his registration number, his professional address, and such other identifying information as is specified in section four A, and shall send to each registrant a copy thereof

### THE INDISPENSABLE VITAMIN

PARALLEL with a deplorable amount of commercial ballyhoo concerning the vitamins, much serious and valuable investigative work continues to go forward. Vitamin D continues as one of the favorite children of the advertising brain trust, although actual knowledge as to its exact effects and dosage is still so uncertain that authorities at the University of California Medical School and the San Francisco Health Department consider inadvisable "any attempt to increase the sale of a product, especially milk, by the addition of a substance whose value to the public health is still a controversial problem."

The manufacturers of proprietary remedies have some time since become vitamins A and B conscious, their contentions based not so much on the ill-effects of a definite deficiency in these substances, as on the positive benefits to be derived from very large doses of them, vitamin A, for instance, increases the tissue's resistance to infection, and vitamin B, according to optimistic reports, stimulates the appetite to hitherto unknown proportions. Vitamin E, the fertility vitamin, the latest to be brought before the public, not only prevents abortion but erases adolescent acne as if by magic.

Vitamin C, the oldest known and possibly the most important of the accessory substances has so far received its ballyhoo mainly from the producers of natural foods. The human race, as the report of President Hoover's White House Conference stated, lives from hand to mouth so far as its supply of ascorbic acid is concerned, for it depends for this upon its annual crops of fresh fruits and vegetables. As a consequence the comparatively recent isolation of this acid and its synthesization from glucose may have more far-reaching effects on the welfare of the race than the work which has been done on all the other vitamins put together.

The chief obstacle in the way of preserving vitamin C for future needs has lain in its susceptibility to destruction by oxidation. Paul F. Sharp, writing in *Science*, tells us that this susceptibility to oxidation depends partly on the fact that plant tissues containing ascorbic acid apparently contain also an ascorbic acid oxidizing enzyme which is liberated when the

cells are crushed. The large amount of ascorbic acid present in cabbage, for instance, is completely oxidized within five minutes after the previously frozen raw cabbage cells are disintegrated. Ruminants, consequently, despite the large amounts of ascorbic acid ingested, must either synthesize the acid for their uses, or reverse the oxidation process. It is known that such animals as rats, whose diets rarely contain ascorbic acid, are able to synthesize it from glucose, the basic product from which commercial ascorbic acid is now manufactured.

Sharp points out that the ascorbic acid content of fresh cow's milk varies little through the seasons. Milk also, however, contains an oxidizing enzyme which eventually destroys the acid. Pasteurization, instead of accelerating oxidation as has been usually believed, may actually inhibit it, since under proper conditions more of the enzyme than of the ascorbic acid is destroyed by heat. The presence of copper, however, accelerates oxidation unless the temperature reached is high enough practically to destroy the enzyme completely. These investigations emphasize the necessity, if ascorbic acid is to be preserved in milk, of banishing copper from pasteurizing machines and holding vats and it is doubtful if even under the best conditions milk can be relied upon to contain a protective amount.

Fresh milk has been found to contain 20.1 mg ascorbic acid per liter. After being held for three days at 2° C this figure is found to have dropped to 11.3 mg, if the milk has been pasteurized for 30 minutes at a temperature between 62 and 63° C the figure is 11.0 mg, if copper is present the ascorbic acid content will have dropped to 1.7 mg.

The antiscorbutic needs of the human infant are not definitely established, but it is probable that at least 20 mg a day are necessary to maintain a margin of safety.

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

MINOT, GEORGE R. A.B., M.D. Harvard University Medical School 1912 S.D., F.R.C.P. (Edin.) Professor of Medicine, Harvard University Medical School. Director, Thorndike Memorial Laboratory, and Visiting Physician, Boston City Hospital. Member, Board of Consultation, Massachusetts General Hospital. Consulting Physician, Peter Bent Brigham and Beth Israel Hospitals, Boston. His subject is "Harvard and Nutrition." Page 1147. Address: Thorndike Laboratory, Boston City Hospital, Boston, Mass.

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**MISCELLANY**

**HEALTH INSURANCE STUDY IS INITIATED BY  
SECURITY BOARD**

The Social Security Board has initiated a study looking to possible proposal of a major addition to the social security system in the shape of health insurance it was disclosed recently

As large a Federal project for social welfare as either unemployment insurance or the old age benefit insurance system health insurance would provide both medical services and cash payments in partial compensation for wage losses due to illness Should legislation for this purpose be sponsored, it would probably be of the same universal type as the old age benefits The coverage would extend to most of the working population of the nation and taxes would be required to finance it

**EARLY PROPOSAL DELAYED**

An official proposal considered two years ago but postponed contemplated establishment by the Federal government of minimum standards for health insurance practice and provision of grants or other incentives to states undertaking the development of systems meeting the Federal standards The fact is cited that nearly every large industrial country of the world has applied the principle of insurance to the risks of illness

The new study is in line with recommendations made by Harry Hopkins WPA Administrator in a recent speech to the United States Conference of Mayors and the report of the executive council of the American Federation of Labor

A spokesman for the Social Security Board said that the board had drawn no bill on the subject and had made no commitment as to sponsoring the new line of insurance Invoking the authority of Section 702 of the social security act however the board has directed that a research study of the subject be made and experts are starting work in this connection it was stated. In view of the promise of President Roosevelt to avoid new taxes at the coming session of Congress it is possible that the Social Security Board may temporarily withhold pressing the health insurance proposal even if it should decide to recommend favorable action on the basis of the projected studies

**COST ESTIMATE IS HIGH**

Comprehensive health insurance has been estimated as likely to cost the equivalent of more than 5 per cent of pay rolls The President's committee on economic security in January 1935 prepared a tentative plan but recommended further studies It found that the cost of wage-loss payments would be 1 to 1 1/2 per cent of pay roll It estimated that families

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actuarial data benefits methods of organization public relations, annual subscription rates secondary relations of hospital service plans to the medical profession public welfare activities state departments of insurance, private insurance companies, hospital administration and hospital accounting. This program is a continuation of the activities of the American Hospital Association since 1933.

Dr. Rorem, who is a certified public accountant, was formerly associate professor at the University of Chicago and is the author of a university text in accounting as well as several volumes dealing with the economic and financial aspects of hospital and medical care. Since 1931 he has been associate director for medical services of the Julius Rosenwald Fund and since 1933 has been consultant in group hospitalization to the American Hospital Association.

Enrollment in group hospitalization plans is now approaching one-half million employed subscribers and dependents with more than 150,000 participating in the three-cents-a-day plan for hospital care in New York City. Plans which have enrolled more than 25,000 employed persons are those in Rochester, New York, Cleveland, Ohio, Washington, D. C., Minneapolis and St. Paul, Minnesota, and Dallas, Texas. Other plans with 5,000 or more subscribers and dependents are those in New Orleans, Syracuse, St. Louis, San Antonio, Houston, Memphis, Sacramento, Newark, Charleston, and Bluefield, West Virginia, Kingsport, Tennessee, and a state-wide plan for North Carolina. Nonprofit city-wide hospital service plans have been established or are being organized at the present time in Chicago, Buffalo, Albany, Louisville, New Haven, and Boston.

### COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1935 AND SEVEN YEAR AVERAGE

MONTH ENDING DECEMBER 5, 1936

Diseases	1936				Average cases reported for week corresponding to Dec. 5 for past seven years	1935			
	Week ending Nov. 14	Week ending Nov. 21	Week ending Nov. 28	Week ending Dec. 5		Week ending Nov. 16	Week ending Nov. 23	Week ending Nov. 30	Week ending Dec. 7
Chickenpox	75	130	102	161	146	96	121	89	149
Conjunctivitis Infectious	3	—	—	2	—	—	—	—	—
Diphtheria	1	6	1	4	14	3	1	4	9
Dysentery Bacillary	2	1	—	1	—	1	—	—	—
Encephalitis Epidemic	—	—	—	1	—	1	—	—	—
German Measles	3	3	2	7	6	9	13	19	4
Influenza	5	4	1	4	5	3	2	13	9
Measles	22	75	43	75	75	52	55	29	110
Meningococcus Meningitis	—	—	—	1	—	1	1	2	—
Mumps	45	107	54	51	50	29	63	45	65
Paratyphoid Fever	3	1	1	1	—	—	2	1	—
Pneumonia (Broncho)	42	30	26	31	30	19	9	12	24
Pneumonia (Lobar)	37	33	18	29	32	17	18	13	34
Poliomyelitis	—	2	—	—	—	3	6	5	2
Scarlet Fever	38	35	32	44	60	27	54	32	33
Smallpox	—	—	—	—	6	—	—	—	—
Streptococcus Sore Throat	1	1	2	—	1	2	1	—	1
Tetanus	—	—	1	—	—	—	—	—	—
Trachoma	—	1	—	—	—	—	—	—	—
Trichinosis	—	—	—	1	—	2	—	—	2
Tuberculosis (Pul.)	31	19	19	13	24	23	22	13	26
Tuberculosis (O. F.)	—	2	—	—	2	2	1	1	3
Typhoid Fever	—	3	2	1	3	2	1	—	1
Undulant Fever	1	3	3	3	—	3	2	4	3
Whooping Cough	124	151	72	119	64	82	110	75	71
Gonorrhea	23	20	26	33	50	27	34	26	22
Syphilis	38	31	49	65	58	26	42	37	49

Remarks: No cases of Asiatic cholera, glanders, plague or yellow fever during the past seven years.

with up to \$3,000 earnings a year are spending 4½ per cent now of their income for medical care. Under existing social security legislation the unemployment insurance tax will run to 3 per cent of pay rolls, payable by the employer, and the old age benefits will cost 6 per cent shared equally by employers and employees. State and Federal money, however, is already being raised and spent for a certain amount of medical care which would be covered in the service offered by health insurance. It is held improbable that any recommendation would contemplate raising all the cost of health insurance from pay roll taxes.

The Security Board's study will be under the general direction of Walton Hale Hamilton, economist, head of the research division and former member of the National Industrial Recovery Board.

Existing systems of unemployment compensation and old age benefits are generally believed in Security Board circles as sure to bring health insurance to the fore.

Unlike unemployment compensation and old age benefits, health insurance requires the building up of no large reserve, officials say. The plan can be placed on a pay-as-you-go basis, each year's cost being met out of the year's receipts. Also, unlike the other two insurance plans already established, the insured worker under health insurance gets benefits from the start. He does not have to wait until the next depression or until he reaches old age. Accordingly, it is believed there is less difficulty in the collection of the taxes or contributions than in these other forms of insurance.—Excerpts from an article in the *N Y Herald Tribune*, Nov 23 1936.

#### ACTIVITIES OF THE AMERICAN SOCIAL HYGIENE ASSOCIATION

Plans for the first National Social Hygiene Day, to be held February 3, 1937, are announced by the American Social Hygiene Association, of 50 West Fiftieth Street, New York City. On this day state and community voluntary organizations interested in the control of syphilis and gonorrhea and other social hygiene problems, with the advice and approval of health authorities and the medical and allied professions, are planning to hold meetings all over the United States.

In New York City the American Social Hygiene Association will hold its annual meeting on February 3. Also the Social Hygiene Council of Greater New York will hold its Fifth Annual Regional Conference at the Hotel Pennsylvania on the same day. It is expected that public leaders including Surgeon General Parran, President Ray Lyman Wilbur of Stanford University, President of the American Social Hygiene Association and former Secretary of the Interior, will speak to these meetings. National agencies and many of their state and community organizations which include social hygiene activities in their yearly programs are planning to participate. It is probable that a nationwide radio

hookup will provide addresses of great importance from high government officials and civic leaders in different parts of the country as a climax to the activities of the First National Social Hygiene Day.

There has been definite progress all along the line during the past year in public understanding and support of the campaign against syphilis. News papers and magazines are opening their columns to public discussion of this health menace to a greater extent than ever before. Certain important groups such as the General Federation of Women's Clubs and the National Council of Women, are adopting the fight against syphilis as among their next major efforts in promoting community health. (The women's groups are particularly interested in the elimination of prenatal or congenital syphilis, which acquired by a child before birth from an infected mother is responsible for a large share of stillbirths, miscarriages and defective children, and which is entirely preventable by proper treatment.)

Service luncheon clubs, such as Rotary, Kiwanis and Lions, have recently been undertaking social hygiene programs. Business leaders are studying the cost to industry, from lost time, lowered efficiency and hospitalization due to syphilis. The large insurance companies are concerned over the unnecessary claims for death and disability due to syphilis. Civil clubs, forums and town meetings are discussing the diagnosis and treatment of syphilis as a national plague.

It is believed that the direction of united nationwide attention to this subject in the way that is proposed will help professional and lay community leaders to capitalize and increase this new interest and consolidate for further advance toward meeting General Parran's challenge to 'stamp out syphilis'.

#### VOLUNTARY HOSPITAL INSURANCE

A gift of \$100,000 to the American Hospital Association for the study and development of voluntary hospital insurance was announced by Edwin R. Embree, president of the Julius Rosenwald Fund, at the annual meeting of the Fund recently held in Chicago. This plan, known as group hospitalization, enables persons of moderate means to secure hospital care by payments of from \$6 to \$12 per year without recourse to charity.

The program of the American Hospital Association will be carried forward through a special Committee on Hospital Service of which C. Rufus Rorem of Chicago becomes executive director. The chairman of the Committee is Dr. Basil C. MacLean of Rochester, New York, and other members are Dr. R. C. Buerki, Madison, Wisconsin; Dr. S. S. Goldwater, New York City; Msgr. Maurice F. Griffin, Cleveland, Ohio; and Dr. Claude W. Munger, president of the American Hospital Association.

The work of the Committee on Hospital Service includes two phases: first, advice and consultation to existing plans and those being formed concerning



plicated the situation considerably because the layman in many cases did not use the spray so effectively and thoroughly as a physician would have. The results show among other things that the method is not suitable for use except by physicians. Dr. Armstrong commented:

A house-to-house survey was made of 20 representative districts in Birmingham and 7 districts in surrounding Jefferson County. In this group 5,010 persons out of a total of 8,093 used the spray at least once. (The directions were to use it every other day for a week and then once a week for the duration of the epidemic.) If the same rates prevailed in the entire area of Birmingham city and Jefferson County, 270,000 persons were sprayed and 160,000 were not. It is calculated:

In the sprayed group 7 cases of infantile paralysis developed. In the unsprayed group 8 cases developed. Calculating the number among the sprayed group who might have been expected to get the disease on the basis of the percentage among the unsprayed who developed it, Dr. Armstrong got a ratio of 16 to 21.7. This indicates that about one-third or 35 per cent were protected by the spray. — *Science News Letter*, November 28, 1936

#### KNOW WELL WHERE YOU SELL

In the purchase and sale of securities as with anything else, experience and good sense warn you to know your dealer. A reputable broker or investment banker is as important to you in his own field as a retailer in his.

Too often this wise precaution is taken only as to those from whom you buy. Equally important and especially in the sale of your own securities is it important to know him through whom you sell.

If reputable, responsible and trustworthy, your securities dealer will build future confidence based on past performance.

If he is disreputable, irresponsible and untrustworthy, it may cost you your life savings to entrust him with the sale of your securities. Many such dealers depart with your cash or securities and leave no forwarding address.

Look well before you sell. Know well where you sell. — *Boston Better Business Bureau*

#### PROTECTION OF CHILDREN FIRST AIM OF FEDERAL CAUSTIC POISON ACT

Fines were recently assessed against a number of manufacturers and distributors including ten druggists and paint dealers in the District of Columbia for selling caustic or corrosive materials in containers which did not meet the labeling requirements of the Federal Caustic Poison Act, according to officials of the Food and Drug Administration, U. S. Department of Agriculture.

Such common household articles as lye used in softening water, cleaning out drains and kitchen sinks, or ammonia used in cleaning, are dangerous poisons and by law must be labeled as such. Children

cannot be expected to read such labels. The products should invariably be stored in a safe place and especially should be kept well out of the reach of children.

Two recent examples of such poisoning have been widely publicized. A small boy in Chicago and another in Washington, D. C., each swallowed lye enough to sear the tissues of the throat and esophagus until death by starvation appeared certain until proper treatment was instituted. Both are now on the road to recovery.

Congress passed the Federal Caustic Poison Act on March 4, 1927, for the purpose of insuring the use of poison labels on the dangerous products and thus putting users on their guard. Enforcement of the Act was assigned to the Food and Drug Administration.

The law applies to the following substances in the percentages noted or more: Hydrochloric acid, 10 per cent; sulfuric acid, 10 per cent; nitric acid, 5 per cent; carbolic acid, 5 per cent; oxalic acid, 10 per cent; any salt of oxalic acid, 10 per cent; acetic acid, 20 per cent; hypochlorous acid or its salts, except chlorinated lime to yield available chlorine, 10 per cent; potassium hydroxide, 10 per cent; sodium hydroxide (caustic soda and lye), 10 per cent; silver nitrate, 5 per cent; and ammonia water, 5 per cent.

There are four distinct markings which must appear conspicuously on the label to meet the specifications of the Act. They are as follows:

1. The word POISON must be printed in undecoded Gothic capital letters. These letters must be at least one-third of an inch high if the trade name or any other word on the label contains a letter this large. If there is no letter this large, the word POISON must not be smaller than the largest letter.

2. Directions for treatment of the poisonous substance must be stated on the label. The Food and Drug Administration has published antidotal treatments for each of the 12 caustic or corrosive substances covered by the act. They are intended primarily to relieve the patient until a physician arrives to administer more thorough treatment if necessary.

3. The common name of the caustic or corrosive substance must be printed on the label. This not only is informative for those who use it in the home, but it is of particular value to the physician as he can give immediate medical attention.

4. The label also shall bear the name and place of business of the manufacturer, packer, seller or distributor.

The cases against the ten druggists and paint dealers in the District of Columbia were based on sales of oxalic acid, acetic acid and ammonia water without the labeling required by the law. The cases were first offenses on the part of the defendants; apparently for this reason the court, after each had entered a plea of guilty, imposed a nominal fine of \$10 in each case. The statute provides for a fine of

## INCREASE IN CANCER DEATHS IS APPARENT NOT REAL

Those who have been worrying over the menace of an increasing cancer death rate can ease their fears and take heart from the optimistic note on cancer struck by the latest figures of the Metropolitan Life Insurance Company

The increase in the cancer death rate during recent years is more apparent than real. No more people are dying of cancer now than 25 years ago but more cancer deaths are being recorded because of better diagnosis. In certain groups notably white women between the ages of 35 and 54 the death rate has declined significantly in the past 25 years. Only over the age of 65 has the cancer death rate for white women shown an upward trend.

These are among the findings of a survey of cancer deaths among the company's industrial policyholders during the past quarter century.

Even among white males the cancer death rate is not quite a third higher than that of 25 years ago. This increase, it is believed, is due to improved diagnosis, more cases being recognized now as a result of improvements in modern medicine during the past quarter century. These improvements in diagnosis have caused an apparently greater increase in the cancer death rate for men than for women in the 25 years, because in men cancer occurs more often in internal organs where it was not easily accessible for diagnosis.

Bearing out this point which argues that the increase in cancer deaths is more apparent than real is the fact that the recorded death rates from cancer in accessible places have declined while those from inaccessible cancers have increased.

Other hopeful developments in the cancer situation in the United States are the growth of facilities both public and private for treating cancer and the improvement as a result of special training of the physicians' ability to diagnose and treat cancer effectively.

Also encouraging is the fact that between 1932 and 1935 the American College of Surgeons collected data on 25,000 patients living five or more years after treatment for cancer without recurring signs of the disease.

The true death rate from cancer may not have increased but cancer still remains a major public health problem. The life insurance company's statistician Dr. Louis I. Dublin points out. Cancer ranks second only to heart disease as a cause of death and still takes 135,000 lives each year.—*Science News Letter*, November 14, 1936

## LOCAL HEALTH OFFICERS CAN FIGHT MENTAL DISEASE

People in all ages and in all walks of life may need help in protecting themselves from mental illness. Dr. B. Liber, New York City psychiatrist, indicated. He pointed out that preventing mental dis-

ease is as much a problem for public health agencies as preventing smallpox or other physical disease.

Cooperation of trade unions and of employers should be gained by health officers in order to protect the mental health of workers. Dr. Liber said. Employers should learn that it is to their own advantage that the workers be clear minded, alert and calm in order to prevent accidents and to produce more and better quality work.

Child upbringing, sexual problems in youth, marital problems and industrial difficulties constitute the worst causes of mental maladjustment. Dr. Liber said.

Other methods by which health departments can protect mental health as suggested by Dr. Liber are the following:

- 1 Preventive mental clinics for transition cases of adults
- 2 Mental hygienists in all elementary public schools
- 3 At least one mental examination of all pupils
- 4 Behavior problems solved in cooperation with parents
- 5 More attention to mental hygiene in schools for teachers
- 6 More and better Child Guidance Clinics
- 7 Easy courses in child upbringing for parents and future parents preferably in public school buildings
- 8 Marital consultation bureaus not compulsory, but friendly, sympathetic and confidential for young men and women before marriage. Discouraging unions between families where insanity or feeble-mindedness prevails. Discovering gonorrhea, syphilis, tuberculosis in candidates for marriage.
- 9 Classes for adolescents in sex education. Dispelling fears and anxieties due to ignorance and leading to mental maladjustment.—*Science News Letter*, November 14, 1936

## THIRTY FIVE PER CENT SUCCESS IN USE OF SPRAY FOR POLIOMYELITIS

About one third of those persons who used the alum picric acid nasal spray as a preventive of infantile paralysis during the epidemic in Southern states last summer were protected against the disease by this spray.

This appears from the first report of results with the spray. The report was given by Dr. Charles Armstrong, U. S. Public Health Service officer who developed the spray at the meeting of the southern branch of the American Public Health Association.

While these results are somewhat disappointing to Dr. Armstrong and his associates, investigations are now under way which it is believed will give a more effective method of prevention in time for use next summer.

The spray was used on a large scale on children and young adults during the outbreak in the South last summer. Since September Dr. Armstrong has been gathering reports on its use. The fact that it was used by laymen as well as physicians com-

spread of part time farming and by an appreciation by the middle and upper classes of their responsibility for the reproduction of the race and the welfare of the Nation —U S Department of Agriculture, Office of Information

SOCIAL SECURITY, AND PHYSICIANS

Various Social Security Act forms are being distributed at this time to millions of employees and employers

What is the status of physicians?

1 Old Age Benefits A physician who employs one or more persons in his office is an employer as defined by the Social Security Act He as well as his employee or employees, is subject to the taxing provisions of Title No 8 of the Act which deal with old-age benefits

(a) A physician in the classification of employer" should fill out the Social Security forms So should his employee or employees Forms should be filed with the local postal authorities or the district Internal Revenue Office

(b) A physician in the classification of employee' is considered an independent contractor, and thus is not subject to the taxes imposed on an employee, except where the physician is regularly employed on a full or part time basis and is receiving a salary

The old age benefit taxes imposed on employers and employees apply to wages paid on or after January 1, 1937 Tax returns must be filed and the tax paid monthly Information returns must be made quarterly The present tax is 1 per cent and is imposed on the first \$3000 of wages paid to any employee during the calendar year

2 Unemployment Compensation Unless a physician has eight or more employees, he is exempt from Title No 9 of the Act relating to unemployment compensation and is not subject to the payroll tax imposed by that part of the Act.

Detailed information on forms taxes procedure, and so forth, will be found in Regulations 91 relating to employees and employers' taxes under Title No 8 of the Social Security Act If a copy of Regulations 91 cannot be obtained from local postmasters one may be obtained from the Collectors of Internal Revenue of the respective districts

CORRESPONDENCE

THE NEW ENGLAND REGIONAL COMMITTEE  
ON FRACTURES OF THE AMERICAN COLLEGE  
OF SURGEONS

Editor *New England Journal of Medicine*

It would appear appropriate to let the readers of *The New England Journal of Medicine* know the personnel and locations of the various Surgeons on The New England Regional Committee on Fractures of the American College of Surgeons Each of the five states included in this committee has its

own chairman who is responsible for the membership in his own state and the carrying out there of a definite program for the education and improvement in the treatment of fracture cases

In Boston on September 18, 1936 began the organization of the five New England States into the Regional Fracture Groups of the American College of Surgeons For some months this has been under way and approval by the American College of Surgeons has finally been given to all members on this committee from Maine, New Hampshire, Vermont, Massachusetts and Rhode Island

The Executive Committee which lays out the program of activity for each year, consists of the five state chairmen, the four members from New England on the General Fracture Committee of the American College of Surgeons the Chairman for New England, Joseph H. Shortell, and the Secretary

The program of activities of this Committee for this year is as follows (1) completion of membership in the Committee (2) cooperation with the American Red Cross in its campaign for better treatment of highway accidents (3) improving the equipment and fracture treatment in all hospitals in the states and (4) the holding of fracture symposia in the spring of 1937 in each state to bring the subject of fractures to the attention of medical men

The membership in the Committee stands as approved by the American College of Surgeons as follows

Maine

State Chairman—Allan Woodcock Bangor

- Harold W Garcelon, Auburn
- William J O Connor Augusta
- Roland L. McKay, Augusta
- Samuel S Silsby, Bangor
- Peter S Skinner, Bangor
- Raymond E Weymouth Bar Harbor
- Edwin M Fuller, Bath
- Carl H Stevens, Belfast
- David E Dolloff, Biddeford
- George A Gregory Boothbay Harbor
- Willard H Bunker Calais
- Frederick L Gregory, Caribou
- Charles C Knowlton Ellsworth
- Herrick C Kimball, Fort Fairfield
- Frank H. Jackson, Houlton
- Horace L Gauvreau Lewiston
- Carleton H. Rand, Lewiston
- Blinn W Russell, Lewiston
- John F Hanson Natchias
- Joseph B Drummond Portland
- Charles H. Hunt Portland
- Henry W Lamb Portland
- Storer W Boone, Presque Isle
- Neil A. Fogg Rockland
- Eugene M. McCartv, Rumford
- Stephen A Cobb Sanford
- George E Young Showhegan
- Charles W Bell Strong
- Edward H Risley Waterville
- Edward W Paine Waterville

not more than \$200 or imprisonment for not more than 90 days, or both—*U S Department of Agriculture*

**EDITORIAL NOTE** Whoever notices improperly designated containers should refer the matter to the authorities

#### REPORT OF THE DEPARTMENT OF HYGIENE AT HARVARD UNIVERSITY

The first annual report on the newly reorganized Department of Hygiene at Harvard University was issued December 10, 1936, by Dr Arlie V Bock, Henry K. Oliver Professor of Hygiene. The report indicated a steady growth of the various types of services rendered to the students and generally improved facilities over those of former years.

The report revealed that 20 per cent of the college students were admitted to Stillman Infirmary during 1935-1936 and that an additional 15 per cent were sent home to bed. A total of 48,843 visits to the various branches of the Hygiene Department were made, but of these only 2,709 resulted in medical excuses from classes being given. This last figure represents a considerable reduction from the experience of former years.

The 1,463 cases cared for at Stillman Infirmary spent on the average 3.9 days there, while the 211 men who were admitted to hospitals were confined for 12.6 days per man. The majority of the Stillman patients went there for 'acute respiratory infections', under the designation of colds. A total of 41 per cent of the hospital cases, 66, were for appendix operations.

The report stated that "more accidents of a serious nature occur in skiing than in any other field of sport. This year a fracture of the femur, two fractures of both bones of the lower leg and one case of fracture of two vertebrae resulted from skiing." Only two other serious athletic accidents happened during 1935-1936, in hockey and baseball, both being bad fractures of the lower leg. Football men escaped with one serious injury, a fractured clavicle.

The utility of the newly instituted Psychiatric Clinic, begun last year under the direction of Dr Kenneth J. Tillotson, is found in the 127 men cared for. This department now employs several part-time doctors, one of whom is at the Hygiene office every afternoon and one morning per week. "Ample evidence of the need to expand this work exists, according to the report, 'not because the problem is peculiar to Harvard or any other University, but because general experience of recent years has shown the great frequency with which mental and personality problems, worthy of the attention of a physician or a psychiatrist, are encountered in any community.'

The problems of personality including maladjustments of all sorts, are outstanding in frequency and present the greatest challenge of the day in the practice of medicine both in and outside of university circles,' Dr Bock said. He added that the student himself is often unaware of his difficulties,"

and "a voluntary approach to problems of this sort is usually essential on the part of the students."

With regard to Stillman Infirmary, the report stated that although many alterations and improvements have been instituted and more will be undertaken as soon as money can be obtained, the infirmary has naturally become antiquated in many respects, since the building has served the university since 1903 and was one of the first institutions of its kind in the country.

The present policy of outside hospitalization in serious cases will be continued, because the scope of hospital practice is beyond the responsibility which should be assumed by the Department of Hygiene, the report said.

Among the many ailments treated were listed nine animal bites, one human bite, and thirteen insect bites—*University News Office*

#### POPULATION TO REACH PEAK IN 1950 THEN DECLINE

A declining national population is inevitable within 15 years unless the birth rate should rise or immigration increase, according to Dr O. E. Baker of the Bureau of Agricultural Economics.

"The birth rate has declined more than 25 per cent during the last 10 years. If the birth rate continues to decline at this rate," Dr Baker says, "a maximum population will be reached by 1945 or 1950. Thereafter the population will decline, declining slowly at first, then at an accelerating rate."

A declining national population, with rural surplus and urban deficit in births, will have serious economic and social consequences in Dr Baker's opinion.

These consequences will develop slowly and silently, he predicts, adding that it probably will be 25 years before many people will realize what is taking place.

"Fifty years from now," Dr Baker says, "there may be only a third as many children in the Nation as now and only half as many women of child-bearing age. There will be nearly three times as many old people. Many unemployed urban people will seek shelter and sustenance with relatives and friends on farms. Many of these people will start little farms and never again return to the cities to live."

"Millions of farm youths will migrate to the cities, many of these migrants will inherit farms, or, through the settlement of estates, acquire mortgages on farms. Wealth—represented by the ownership of land or the income from it—will be transferred to the cities."

Dr Baker says that other millions of farm youth will begin farming, mostly on farms vacated by the death of aged farmers. Unless these farms are acquired by inheritance, he declares, there will be an increasing number of tenants.

But there is a way to retard these ominous developments, in the opinion of this economist. They can be retarded, he says, by a rapid decentralization of population, industry and commerce by the

The Prevention of Volkmann's Contractures—  
Stephen Jones M D  
The Routine Treatment of Suspected Head In-  
juries—John S Hodgson, M D  
Fractures of the Shaft of the Humerus—George  
Van Gorder M D  
Böhler Pin and Plaster Treatment of Long Bone  
Fractures—Richard Dwight, M D  
Question and Answer Period

Boston City Hospital 25 p m

Dislocation of the Carpal Trapezoid — Thomas  
Peterson M D

The Nailing Technique in Fractures of the Neck  
of the Femur—Newton C Browder M D

Serious Multiple Fractures — Russell Sullivan  
M D

Fracture Through the Acetabulum — Joseph H.  
Shortell M D

Ruptures of the Supraspinatus Tendon—Joseph  
H Shortell M D

Fractures In and About the Ankle—Frederic J  
Cotton M D

Fractures of the Os Calcis — Otto J Hermann  
M D

Fractures of the Olecranon — Kenneth Coonse  
M D

Fractures Through the Epiphyses (end results)  
—Alexander Aitken M D

AUGUSTUS THORNDIKE, JR M D

Secretary for New England

319 Longwood Avenue Boston

## THE TREATMENT OF VARICES

December 11 1936

Editor *New England Journal of Medicine*

On reading the article by Drs Whitney and Con-  
sales on the management of patients with varicose  
veins in the December 3 issue of the *Journal* sev-  
eral points came to mind about which mention  
should be made In their summary there appears  
the statement that the present-day confusion con-  
cerning the treatment of varicose veins is the result  
of the rapid progress made in the field during the  
past ten years The authors are certainly not con-  
fused about the treatment and have written an ex-  
cellent paper

They might also have found less confusion in the  
general literature if they had availed themselves of  
some of the writings of the past 5 years The doc-  
tors have either not been acquainted with or have  
avoided mention of several excellent articles on the  
management of patients with varices as those by  
Howard Jackson and Mahon *Arch Surg* 1931  
De Takats *Arch Surg* 1933 Faxon *Arch Surg*  
1934 and Edwards *Surg Gynec Obst.* 1934 In  
stead of referring to these writers Drs Whitney  
and Consales have referred to Moszkowicz *Zentralbl  
f Chir* 1927 crediting him with the proposal that  
the saphenous be ligated at the sapheno-femoral junc-  
tion in order to avoid recurrences Actually Mosz-  
kowicz stated that he usually ligated below the

sapheno-femoral junction Furthermore the main  
reason that he gave for doing ligations preliminary  
to injection was that in this way he could prevent  
embolism and do a better injection by the subcuta-  
neous route He did make a brief note that the  
saphenous veins might be ligated at the sapheno-  
femoral junction, and that this might be better if  
the vein were dilated high in the thigh All of us  
now realize that ligation should not be limited to  
patients with such a dilation

The actual classification of the patients for pur-  
poses of treatment is very well stated by Drs Whit-  
ney and Consales It is pleasant indeed that these  
indications should, in 1936 tally so well with the  
indications written in the articles quoted above In  
particular the authors have neglected in describing  
their treatment of short saphenous varices to refer  
to my 1934 article In this so far as I know I was  
the first to point out that there are essential dif-  
ferences between varices of the short saphenous  
and varices of the great saphenous For anatomic  
reasons substantiated by clinical evidence I, at that  
time adopted the principle that the short saphenous  
need not be ligated no matter how large the varices  
of that vein were in distinction to varices of the  
great saphenous vein

Yours truly

EDWARD ALLEN EDWARDS M D

330 Dartmouth Street

Boston Mass

## VACCINATION AND INOCULATION SERVICE

December 2 1936

Editor *New England Journal of Medicine*

I am somewhat in disagreement with the distin-  
guished Vice-President of the Massachusetts Medi-  
cal Society regarding the activities of the Depart-  
ment of Health in regard to preventive inocula-  
tions in Boston

In the toxin-antitoxin inoculations and vaccina-  
tions in New York City and other cities that I have  
studied the utmost cooperation is provided for phy-  
sicians and no one receives these treatments free  
except the indigent

In Boston thanks to the nurses of the Depart-  
ment of Health and school nurses this type of free  
service has become quite popular

The procedure in the toxin antitoxin campaign is  
as follows

Cards are sent out by Dr Keenan and Dr Wiln-  
sky to be distributed in schools to the parents of  
pupils who have not been vaccinated advising such  
parents to consult their family doctors In the  
parochial schools a note is appended that the De-  
partment of Health will inoculate the children on a  
certain date usually two weeks afterwards There  
is no response to this as a rule and very shortly  
after the first card is sent out the nurses distribute  
another card which requests the parents to sign  
permission for the city to do this work free

There have been conferences with Dr Wilinsky  
by the committee from the Norfolk District Medical

*New Hampshire*

State Chairman—Ezra A Jones Manchester

D J Sullivan Manchester  
Z A Lavoie Manchester  
Robert Graves Concord  
Carleton Metcalf Concord  
Philip McQuesten, Nashua  
Timothy Rock, Nashua  
Emery Fitch Claremont  
John Gile Hanover  
James Woodman Franklin  
L A Middleton, Plymouth  
W H Lacey, Keene  
T C Pulsifer Berlin  
Chester Smart Laconia  
G Harold Shedd Conway  
J A Ferguson Lancaster  
Henry M Wiggin, Whitefield  
Ralph M Jones, Whitefield  
E C Batchelder, Dover  
Thomas Luce \* Portsmouth  
W J Roberts, Rochester  
W J Dye Wolfeboro

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Philip Wheeler, Brattleboro  
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Benjamin D Adams Burlington  
George M Sabin, Burlington  
A C Kinney, Hardwick  
S S Eddy Middlebury  
F W Hairman, Montpelier  
R H Bisson Montpelier  
D J Sheehan, Newport  
Philip A Goddard Morrisville  
Thomas A Hack, Proctor  
Wilmer W Angell, Randolph  
Charles H. Swift, Rutland  
Stewart Ross Rutland  
Edward E Hinds Rutland  
Leon E Sample St Albans  
Paul Bacon Springfield  
Edward H Ross St Johnsbury  
W H Krause Windsor

*Massachusetts*

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Charles E Ayers Milford  
A Leo Brett Boston  
F Augustus Binford Hyannis  
Francis R Burke Quincy  
Charles L Curtis Salem  
George K Coons Boston

Deceased

Frederic J Cotton Boston  
George D Cutler, Boston  
I S F Dodd, Pittsfield  
Joseph H Fay, Melrose  
Arnold P George, Haverhill  
Bernard A Godvin, Boston  
James J Hepburn, Boston  
Otto J Hermann, Boston  
Donald E Higgins, Hyannis  
Benjamin F Jones, Northampton  
Alfred E Johnson Jr, Greenfield  
Edward A. Knowlton, Holyoke  
Harold R Kurth, Lawrence  
Pelce H Leavitt, Brockton  
G A Leland, Boston  
Henry C Marble, Boston  
Eugene A McCarthy Fall River  
Gordon M Morrison Boston  
George W Morse, Boston  
George Mossman, Gardner  
Joseph L Murphy Taunton  
Harvey F Newhall, Lynn  
John W O'Meara, Worcester  
Allan G Rice, Springfield  
Howard W Rogers, Newburyport  
Mark H Rogers, Boston  
James W Sever Boston  
M James Shaughnessy, Framingham  
Joseph Shortell, Boston  
Russell F Sullivan, Boston  
Curtis C Tripp New Bedford  
Augustus Thorndike, Jr, Boston  
Robert Zollinger, Boston

*Rhode Island*

State Chairman—Dr Roland Hammond Providence

Peter P Chase Providence  
Murray S Danforth, Providence  
G G Dupre Woonsocket  
Herbert E Harris, Providence  
John M Helfrich, Westerly  
W A. Horan, Providence  
John P Jones, Wakefield  
S G Lenzner Providence  
Henry McCusker Providence  
William A. Stoops Newport

A one-day clinic (in the morning at the Massachusetts General Hospital and in the afternoon at the Boston City Hospital) was held in Boston on September 19 where illustrated talks and demonstrations of cases were given. Free luncheon was provided at the Massachusetts General Hospital and a dinner attended by 36 men was held in the evening. Sixty four men registered at the clinics. The following was the program.

Massachusetts General Hospital 9 a m 12 noon  
Epiphyseal Separations—Langdon Parsons M D  
Compression Fractures of the Cervical Spine—  
Sumner Roberts M D  
Compression Fractures of the Thoracic Spine—  
Edwin Cave M D  
Question and Answer Period

Knights of Columbus and St Columbkille Court,  
M C O F

Six sisters, Mrs M L Dolan, Miss Annie, Miss Katherine, Miss Ellen, Miss Mary, and Miss Elizabeth Bucklev, and a brother, John Bucklev survive him.

**DIERKES**—WILLIAM F X DIERKES, M.D of 23 Elm Street, Westfield Massachusetts, died at Leeds Hospital, December 5, 1936 only eleven days following the decease of his wife

Dr Dierkes was born in Philadelphia in 1872 He graduated from the Kansas City University of Physicians and Surgeons in 1920 Previous to studying medicine, Dr Dierkes had served in the United States regular army under an enlistment in 1893 with Troop D 8th Cavalry and was discharged in 1896 He again enlisted in the same year and served with Company E, 18th Infantry and was discharged in 1898 because of injuries received in line of duty During the Spanish American War he served in the Philippines

After graduating in medicine he practiced for a short time in Carbondale Pa., before opening an office in Westfield. He was a Fellow of the Massachusetts Medical Society and the American Medical Association, a member of the Noble Hospital Staff and the local medical society president of the Gen. Embury P Clark camp Vicinity council of United Spanish War Veterans of Massachusetts and assistant deputy inspector of the State Department of Spanish War Veterans

Dr Dierkes was especially interested in proctology An only son, John Dierkes, survives him

## NOTICES

### UNITED STATES CIVIL SERVICE EXAMINATIONS

#### AMENDMENT TO ANNOUNCEMENT No 1

Junior Medical Officer (Psychiatric Resident),  
\$2 000 a Year

St. Elizabeths Hospital Department of the Interior,  
Washington D C

Applications must be on file with the United States Civil Service Commission at Washington D C., not later than the following dates

(a) January 7, 1937 if received from the following States Arizona California, Colorado Idaho Montana Nevada New Mexico Oregon Utah Washington Wyoming

(b) January 4 1937 if received from States other than those named in (a) above

Applications will be accepted for the position of Junior Medical Officer (Psychiatric Resident) from persons now serving an accredited rotating internship As stated in the announcement, under Proof of Graduation the names of persons who are now serving but who have not yet completed the required internship will not be certified for appointment until a certificate of the completion of the internship is filed.

Senior Medical Officer—Female (Psychiatry),  
\$4 600 a Year

Junior Medical Officer (Interne), \$2,000 a Year

Junior Medical Officer (Psychiatric Resident),  
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## CORRECTION

Dr Paul W Butterfield a co-author with Dr Olive Gates and Dr Shields Warren whose article "The Value of Histologic Differentiation of Basal Cell Carcinoma" appeared in the issue of December 3, was incorrectly recorded as a graduate of Tufts College Medical School in 'This Week's Issue' on page 1090

Dr Butterfield graduated from Boston University School of Medicine in 1934

## REMOVAL

JAMES A. HALSTED, M.D., announces the removal of his office at 264 Beacon Street to the Faulkner Hospital Telephone Jamaica 3058

He will continue his office in Dedham which, after February 1 1937, will be at 743 High Street

## REPORTS AND NOTICES OF MEETINGS

### HARVARD MEDICAL SOCIETY

The Harvard Medical Society met on Tuesday evening October 27, 1936 at the Peter Bent Brigham Hospital Dr C Macfie Campbell presiding The medical case was presented by Dr R. Lyons A 57 year old white male entered the hospital with a history of pain in the chest and paroxysmal attacks of coughing of 3 years duration. The pain was more severe in the reclining position and during the 7 days before entry had increased markedly in intensity The attacks of coughing had been aggravated by a cold in the chest and the patient often experienced sensations of choking and smothering One year before admission he had received 15 intravenous injections Physical examination showed irregularity of the pupils, which reacted sluggishly to light. The chest was emphysematous and there was a large pulsating bulge to the left of the sternum. There was a systolic murmur at the heart apex and over the pulsating area. The heart rate was 106 beats per minute There

Society, in which Dr Wilinsky agreed to cooperate, and send out notices to parents of children under school age to have the toxin antitoxin work done by the family doctor, and to furnish cards to physicians, saying they were authorized to do this work by the Department of Health the doctors agreeing to do this work for \$3.00 for the three inoculations

Dr Wilinsky has been quite cooperative vocally, but in action he has been negative. No cards were issued, and the nurses have been quite active in the campaign to have all children inoculated by the Department of Health. I have found that home visits have been made by Department of Health nurses to children under school age, whose parents were perfectly able to pay a doctor, and these same parents have been advised to bring their children to the Well Baby Clinics, for this free service.

Some physicians have complained of this situation to the proper authorities. They were told to bring in names of nurses and patients.

Some years ago, before the present management, I submitted "names" to the Peter Bent Brigham Hospital, about "Hospital Abuse." The hospital did a nice job on me. It made enemies of these patients for life.

I would like to call physicians' attention to the fact that Boston has the largest quota of nurses to the population of any city in the United States, 45 nurses per 100,000 population, while in the City of New York, where cooperation between the health authorities and physicians is marked, there are only 18 nurses per 100,000 population.

At least one-half of these nurses should be transferred to city institutions where they are needed.

The taxpayers should not be asked to bear this excess burden of taxation, to support nurses that are of no help to the community.

Conditions in Boston do not affect Dr Frothingham, since he is not in general practice and does not suffer from the encroachment of the Department of Health.

Thousands of dollars are taken away yearly from physicians of Boston, by the action of the Department of Health and their nurses in diverting medical service which rightfully belongs to the profession in Boston.

CHARLES MALONE, M.D.

46 St. John Street,  
Jamaica Plain, Mass

#### AMERICAN MEDICAL ASSOCIATION

535 North Dearborn Street, Chicago

December, 1936

Editor, *New England Journal of Medicine*,

It is very gratifying to be able to tell you that, with the newly enlarged and remodeled headquarters building, the Association has better facilities than ever before for serving your interests and those of the thousands of other members, Fellows, and subscribers to the A. M. A. journals.

Through the Council on Medical Education and Hospitals and the Bureaus of Medical Economics,

of Medical Legislation, and of Public Health, the educational and legal standing of physicians is being safeguarded, and the public health benefited in all sections of the country. Other official bodies, including the Councils on Pharmacy and Chemistry, on Foods, and on Physical Therapy, are working diligently to help physicians on problems connected with drugs, foods, and apparatus.

More specifically, the facilities at headquarters make it possible to furnish *The Journal of the American Medical Association* and the eight monthly special journals at a low cost, which in itself tangibly reflects the benefits of professional cooperation and organization.

During the next year, the Association expects to serve you in the most efficient manner possible. We look forward with pleasure to having your cooperation, as in the past. Thanking you heartily,

Very truly yours,

OLIN WEST,

Secretary and General Manager,  
American Medical Association

#### RECENT DEATHS

**CUDDY**—JAMES F. CUDDY, M.D., aged 54 years, medical examiner since 1921, died at his home, 585 Main Street, Athol, Thursday, December 3, 1936. He had been a sufferer from heart trouble for several years. Two weeks previous to his death he was taken acutely ill but believed he had recovered and resumed practice the last two days of his incapacitation.

He was graduated from the Baltimore Medical College and had practiced in Athol for 30 years. He was elected last April as vice-president of the Worcester North District Medical Society and had been an unusually active member for a number of years. He was also a member of the Athol Council Knights of Columbus, the Tully Medical Society and of the Athol School Committee.

Dr Cuddy is survived by his widow, Claire, two sons and a daughter, all of Athol and by a brother and three sisters.

**BUCKLEY**—WILLIAM STEPHEN BUCKLEY, M.D., of 253 Market Street, Brighton, Massachusetts, died at his home, December 8, 1936.

Dr Buckley was born in 1877, graduated from the Harvard Medical School in 1902 and practiced in Brighton for 30 years. During the World War he served as captain in the United States Army and later held the rank of major in the Officers Reserve Corps.

Dr Buckley's professional activities also included service with the Boston Floating Hospital, the Carney Hospital and membership on the staff of St. Elizabeth's Hospital.

He was a Fellow of the Massachusetts Medical Society and the American Medical Association. He was also a member of the American Legion,



unimportance of love troubles may be due to reticence on the part of the subject to mention such difficulties

Neither drug addiction nor alcoholism was of much importance as a cause for attempted suicide. The methods most frequently used were taking poison by mouth or inhalation of illuminating gas. *Of 322 patients taking iodine not one died from the effects of this poison*

Among many interesting facts revealed by this study were the findings that very few people attempted suicide shortly after eating or on a full stomach. Among women most attempts were made on Wednesday while men were most prone to choose Sunday for their efforts. There were definite increases in the number of suicides among women in the months of May, July, August and September, increases which may be connected with some vestigial sexual relation between these months and primitive mating seasons. More males attempted suicide in April.

Dr. Moore emphasized the fact that the figures which he presented were not representative of the community as a whole but only of the Boston City Hospital. A survey of the cases seen by the medical examiner would undoubtedly reveal very different findings.

He deplored the existing treatment of cases of attempted suicide since they are discharged after routine treatment on regular medical and surgical wards without investigation of the causes and conditions leading to the attempt. The subject of suicide is often ignored in the home of the individual because of the social stigma connected with the act. Dr. Moore advocated the establishment of protective wards in which cases of attempted suicide could be given a thorough examination where a psychiatric examination could be done and where the benefits of the social service department could be made available. Patients from such a ward could be followed in a psychiatric clinic of the outpatient department. Such a method would enable a scientific approach to the problem of the individual and social forces leading to suicide.

Dr. Macfie Campbell, in discussing Dr. Moore's paper, commented on the great number of cases of attempted suicide which were not successful. Such attempts are often not pressed very hard and are frequently made in the presence of an audience. He raised the question of whether a man has the right to commit suicide and pointed out the striking difference in racial beliefs on this subject. He remarked that it was really remarkable that more people did not commit suicide when the miserable conditions in which a large portion of the earth's population is forced to live is taken into consideration.

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F. M. McMURRAY, M.D., Secretary

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was increase in breath sounds and bronchial breathing at the left base, and diminished breath sounds, tactile fremitus and vocal resonance over the left chest anteriorly. D'Espine's sign was present over the fourth thoracic vertebra. There was a pronounced tracheal tug. The blood pressure in the right arm was 135 mm of mercury systolic, and 90 mm diastolic. On the left it was 125 mm systolic, and 80 mm diastolic. There were no signs of paralysis of the recurrent laryngeal nerve, and the reflexes were normal. The Hinton was positive, the Wassermann negative. The pulse rate was slowed by pressure on the vagus nerve and by the administration of digitalis. An electrocardiogram showed paroxysmal auricular fibrillation. X-ray examination of the chest revealed a large mass in the left upper chest with questionable erosion of the vertebral bodies. The patient was given mercury by mouth and by intramuscular injections, with some relief of his pain.

Dr. Marshall Fulton remarked that it was unusual for an aneurysm of the aorta to reach the size of the mass observed in this patient without more erosion of the bone occurring. He raised the question of whether the mass might be a collection of pulsating fluid without the presence of an aneurysm. Dr. Merrill Sosman commented on the x-ray findings stating that the shadow of the mass in the postero-anterior view was indistinct, while aneurysm shadows are usually very clear cut. Pulsations were not marked. He believed that this was an instance in which direct inspection was of more value in making the diagnosis of aneurysm than the refinements of x-ray technique.

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although she still could articulate well. He stated that ventriculography and encephalography were contraindicated because of the danger of breaking down the barrier of resistance in case the patient had a cerebral abscess. The lesion was believed to be very localized because of the absence of neurologic signs and the consensus of the surgical staff was that it was neoplastic in type. Dr. Macfie Campbell emphasized the importance of the finding that the patient could articulate well and could understand conversation. He believed that the sensory form of aphasia as exhibited in this case made the accurate localization of the lesion difficult. The extreme degree of papilledema was considered an indication for immediate operation.

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Sixty-one per cent of the females were between the ages of 16 and 30 years and the majority of these were between 21 and 25 years. There was a definite decline in cases attempting suicide among females after the menopause. This may in some way be correlated with the individual's sex drives. Only 33 per cent of the males attempted suicide between the ages of 16 and 30, indicating that for males suicidal impulses are more sustained and continue into later years.

A study of the causes for the attempted suicides showed that difficulties in connection with jobs were most important among males, while domestic troubles were given the most common reasons by women. Third in ranking reason was ill health while the love motive was of least importance, according to this series. The reasons for the seeming

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R E STONE, M D, *Secretary*

### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, DECEMBER 21, 1936

##### Monday, December 21—

8 15 p m Boston Medical History Club Boston Medical Library 8 Fenway

##### Tuesday, December 22—

11 30 a. m Massachusetts General Hospital Eye Nerve Conference Outpatient Department.

##### Wednesday, December 23—

†12 m Clinical-Pathologic Conference Childrens Hospital Amphitheater

2 p m Massachusetts General Hospital Psychiatric Clinic Outpatient Department.

4 p m - 5 p m Surgical Pathological Conference Dr Cutler and Dr Wolbach, Peter Bent Brigham Hospital

##### Thursday, December 24—

\*8 30 - 9 30 a m Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and the Childrens Hospitals held this week at the Peter Bent Brigham Hospital

9 a m Massachusetts General Hospital Surgical Grand Rounds

9 15 a m Massachusetts General Hospital Neurological Conference Ether Dome

12 m Massachusetts General Hospital Clinical-Pathologic Conference

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

December 17—Medical Clinic at the Peter Bent Brigham Hospital at 3 30 p m by Dr William P Murphy

December 17—Massachusetts General Hospital Clinical Meeting of the Staff at 8 15 p m in the Moseley Memorial Building

December 17—Boston Society of Psychiatry and Neurology See page 1145 issue of December 10

December 21—Boston Medical History Club See page 1145 issue of December 10

December 22—Wachusett Medical Improvement Society See page 1197

January 10 March 21—Sunday Afternoon Lectures at the Harvard Medical School See page 1141 issue of December 10

January 14—Pentucket Association of Physicians Hotel Bartlett 95 Main Street Haverhill at 8 30 p m

January 15—William Harvey Society 8 p m in the Auditorium of the Beth Israel Hospital Boston

January 15—Boston Society for the Advancement of Gastroenterology See page 1145 issue of December 10

February 3—American Social Hygiene Association See page 1136

February 25, 26, 27—The New England Hospital Association Hotel Statler Boston

March 30 April 2—First International Conference on Fever Therapy Postponement notice See page 52 issue of July 2

April 21 24—American Society for Experimental Pathology See page 1075 issue of May 21

October 25 29—American College of Surgeons Chicago Illinois

### DISTRICT MEDICAL SOCIETIES

#### ESSEX SOUTH DISTRICT MEDICAL SOCIETY

January 7—See page 1197

#### FRANKLIN DISTRICT MEDICAL SOCIETY

Will meet at the Weldon in Greenfield at 11 a m the second Tuesday's of January March and May

CHARLES MOLINE M D *Secretary*

Sunderland

### MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

January 13—Bear Hill Golf Club Stoneham

March 16—Danvers State Hospital Danvers

May 11—Bear Hill Golf Club Stoneham

KENNETH L MACLACHLAN M D, *Secretary*  
1 Bellevue Avenue, Melrose

### NORFOLK DISTRICT MEDICAL SOCIETY

January 19—8 15 p m The Peter Bent Brigham Hospital. Communications and Case Presentations by the Staff. Suggested title—'Abdominal Pain from the Medical and Surgical Standpoint. Details of program to be announced

February 23—Time place and details of program to be announced

March 30—8 15 p m New England Deaconess Hospital. A Symposium on Diabetes entitled A Survey of the Diabetic Work of the George F Baker Clinic in the New England Deaconess Hospital. Communications and Case Presentations by the Staff. Drs Elliott P Joslin, Howard F Root, Priscilla White Alexander Marble and Allen P Joslin

May—Annual Meeting Details to be announced.

Note The Censors will meet for the examination of candidates on the first Thursday of May 1937. Fee of \$10.00 is payable at the time of examination. Application blanks may be obtained by writing the Secretary furnishing name address and name of school of graduation in medicine. Application must be made at least three weeks prior to date of examination. Candidates whose applications are on file will receive proper notices

FRANK S CRUICKSHANK M D *Secretary*  
1247 Beacon Street, Brookline

### PLYMOUTH DISTRICT MEDICAL SOCIETY

January 21—11 a m Bridgewater State Farm

March 18—11 a m Brockton Hospital

April 15—Annual Meeting 11 a m Duxbury Hospital

May 20—11 a m Lakeville State Sanatorium

FRED F WEINER M D *Secretary*  
231 Main Street Brockton.

### SUFFOLK DISTRICT MEDICAL SOCIETY

January 27—Boston Medical Library 8 15 p m Joint Meeting with the Boston Medical Library Anthropology Dr Carleton S Coon

March 31—Boston Medical Library 8 15 p m "Social Insurance—It Affects the Medical Profession" Dr Charles E Morgan Discussion Dr Channing Frothingham

April 28—Annual Meeting Boston Medical Library 8 15 p m Problems in Surgical Diagnosis Dr Howard M Clute

CONRAD WESSELHOEFT M D, *President*  
CHARLES C LUND M D *Secretary*

### WORCESTER DISTRICT MEDICAL SOCIETY

January 13—Worcester City Hospital Worcester Mass 6 15 p m Dinner—complimentary by the hospital 7 30 p m Business session and scientific program

February 10—Worcester State Hospital Worcester Mass 6 15 p m Dinner—complimentary by the hospital 7 30 p m Business session and scientific program

March 10—The Memorial Hospital Worcester Mass 6 15 p m Dinner—complimentary by the hospital 7 30 p m Business session and scientific program

April 14—Worcester Hahnemann Hospital Worcester Mass 6 15 p m Dinner—complimentary by the hospital 7 30 p m Business session and scientific program

May 6—At 4 30 in the rooms of the Worcester Medical Library Inc at 34 Elm Street Worcester, will be held the spring meeting of the Board of Censors

Wednesday Afternoon and Evening, May 12—Annual Meeting Time and place for this meeting will be announced in an early spring issue of the Journal.

ERWIN C MILLER M D *Secretary*  
27 Elm Street Worcester

27 Elm Street Worcester

### WORCESTER NORTH DISTRICT MEDICAL SOCIETY

January 27—See page 1197

### BOOKS RECEIVED FOR REVIEW

Allergic Diseases. Their Diagnosis and Treatment Ray M Balyeat, assisted by Ralph Bowen. Fourth Edition Revised and Enlarged 516 pp Philadelphia F A. Davis Company \$6.00

Modern Treatment and Formulary Edward A. Mullen 707 pp Philadelphia F A. Davis Company \$5.00

# The New England Journal of Medicine

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## SEROLOGICAL AND ALLERGIC REACTIONS WITH SIMPLE CHEMICAL COMPOUNDS\*

BY KARL LANDSTEINER, M.D.†

THE subject of this paper might seem to bear no relation to the topic of parasitism under consideration in this session were it not for the fact that similar principles are involved in the exaggerated reactions to chemical agents—known as allergic or idiosyncratic—and in certain responses of the animal body consequent upon invasion by infectious microorganisms. This connection has been brought to light through the development of serological research, and at the same time an ever-increasing array of clinical pictures has been found or assumed to belong in the field of allergy being as multifarious as hay fever, asthma, migraine, mucocutaneous colic, purpura and various cutaneous manifestations including eczema, urticaria and angioneurotic edema.

The knowledge of exceptional untoward effects of drugs, or disturbances resulting from contact with plants or ingestion of food must be as old as medical experience and histories of such cases date from early times. But the phenomena of idiosyncrasy, in particular drug idiosyncrasy, which I propose to discuss in some of its phases, remained wholly inexplicable until the memorable discovery of anaphylaxis. Here it developed that animals treated with a minute dose of a serum died when injected again after a suitable interval with a small amount of the same material. While the work of Behring, Kitasato, and their followers had shown that the administration of toxins or bacteria affords protection or causes increased resistance, an essentially similar mechanism now was seen to induce specific hypersensitiveness to proteins. To all appearances this was a clue to the understanding of drug idiosyncrasy. In both cases very small quantities of otherwise innocuous substances produce severe effects in sensitive individuals, and in both instances the sensitivity is strikingly specific.

Still there are significant differences between the two conditions which at once seemed irreconcilable and which led some to deny any essential relation. In the first place the instigators of drug allergy are substances of low molecular

weight having as a class, for all one knows, no antigenic activity in distinction to antigenic proteins of large molecular size that incite the production of antibodies and induce anaphylaxis, secondly the anaphylactic state can be set up regularly with practically any foreign protein, whereas, as a rule, only a few individuals who come in contact with the drugs in question acquire hypersensitiveness. It was believed, furthermore, that hypersensitiveness in man may occur without previous contact with the exciting agents, a proposition which is difficult to prove conclusively and is rather discounted at present.

The most impressive of these arguments is that relating to the lack of antigenic capacity in the substances causing drug allergy. In this regard the suggestion had been advanced years back that the substances may combine with proteins within the body to form antigens. Yet this hypothesis, at the time based chiefly upon the observation that proteins treated with iodine engender immune sera reacting specifically with iodoproteins, did not carry conviction. It was in fact not possible by immunization with iodoprotein to produce hypersensitiveness to iodine and the antibodies so obtained are not specific for iodine, but for the diiodotyrosine groups contained in the altered protein. The hypothesis, however, subsequently gained support from a series of studies on artificially conjugated antigens.

In essence these investigations<sup>1</sup> established that simple chemical compounds can be converted into antigens by being attached to proteins. To effect this the method that so far has proved to be the most convenient is the preparation of azoproteins by coupling proteins with diazonium compounds, according to the procedure employed in synthesizing common azo dyes. For instance upon diazotization of one of the three aminobenzoic acids, say the para compound and coupling it to proteins a conjugate is obtained which on injection into rabbits causes the formation of antibodies stamped with the pattern of para-aminobenzoic acid. These antibodies react with all azoproteins made from this acid and differentiate them and other azoantigens even those prepared with ortho or meta aminobenzoic acid. Results obtained with a rather wide variety of

\*Read at the Harvard Tercentenary Conference of Arts and Sciences, Cambridge, September 10, 1936.

†Landsteiner, Karl—Member of the Rockefeller Institute for Medical Research, New York City. For record and address of author see *This Week's Issue*, page 1250.

substances were conformable. There now arose the question whether, as had been presumed, the simple compounds, firmly attached to protein, themselves react with the antibodies, or if the chemically modified protein must take part in the reactions, the latter being the case with such altered proteins as oxidized protein, or the iodized derivative already mentioned. A decision in the matter was reached in the following way. The formation of precipitates by the interaction of immune serums and soluble antigens, it was observed long ago, is prevented, or the quantity of the precipitate diminished, if the proportion of antigen is sufficiently increased. The phenomenon depends upon the formation of a soluble compound containing much antigen in relation to the amount of antibody. In dealing with "synthetic" conjugated antigens it seemed not unreasonable to ascertain whether the substance attached to protein and supposed to react with the corresponding antibody could by itself interfere with and thus inhibit the precipitation of a conjugated antigen by the homologous antiserum. If so, the interaction between the simple substance and the antibody would be demonstrated. The outcome of the experiment was affirmative.<sup>2</sup> Accordingly, in the example referred to, the precipitation of para-benzoic acid azoprotein is inhibited by addition of a neutralized solution of para-amino benzoic acid. Examination of numerous cases showed that the specificity of the inhibition reaction is of the same order as that of precipitation reactions and there was no other satisfactory explanation than that the inhibiting substances combine with the antibodies and so block their union with the complete antigen.

A similar effect was demonstrable *in vivo*. Guinea pigs injected with an azoprotein become anaphylactic and are shocked by reinjection of the same antigen or by other azoproteins prepared with the same diazonium compound. If the latter is coupled not to protein but to a phenol, as resorcinol or tyrosine, the resulting dye will usually not elicit anaphylactic shock but will afford protection to the sensitized animal against a subsequent injection of the azo protein.

Interesting experiments devised to demonstrate the specific combination of the azodyes with correlated antibodies were described by Marrack and Smith<sup>3</sup> and Haurowitz and Breinl.<sup>4</sup> An azodye made by combining tyrosine and diazotized para amino phenylarsenic acid was mixed with antibody globulin separated from an homologous antiserum, and the solution was placed in a dialyzing apparatus in order to determine the ratio of azocompound bound by the globulin to free azodye. This ratio was found to be much greater than in control tests with globulins from normal serum or with azocompounds not related to the immune serum.

In general, the union of antibodies and substances of low molecular weight is not accompanied by a perceivable change, yet, with certain azodyes of low formula weight, visible reactions occurred.<sup>5</sup> These compounds were obtained by combining diazotized aminoanilic acids, such as aminosuccinanilic or aminosuberanilic acid with isoreinol. Upon adding immune serums prepared with anilic acid antigens to solutions of the homologous simple dyes, precipitation occurred just as in common precipitin tests with proteins or bacterial polysaccharides and the reactions were observable with antigen dilutions even as high as 1:1,000,000. The same azo compounds produced typical anaphylactic shock in fractions of milligrams, a result once more confirming the relationship between specific precipitation and anaphylactic shock. The peculiarity of the substances is probably connected with a tendency to form colloidal solutions, indeed aged solutions proved to be more suitable for the experiments than those freshly prepared. But the behavior of the anilic acid dyes is not unique inasmuch as similar though slight reactions have been noticed with other azodyes.

In summary we may say that one obstacle to the understanding of drug allergy has been removed since we have learned that immunological reactions are not limited to proteins but take place as well with synthetic substances of simple composition lacking antigenic activity. Moreover, such substances—under special conditions—may, depending upon an antibody mechanism elicit allergic reactions in the animal. A major difficulty remains. In the experiments outlined, antibody formation and the anaphylactic state were induced by conjugated proteins. How are effects of this sort brought about by synthetic chemicals or simple natural drugs where the chemical properties would not immediately suggest that they enter readily into firm combination with proteins?

That drug allergy, despite cases of seemingly spontaneous origin, may be acquired by contact with the excitants had been verified amply by clinical observations, elucidation of the mechanism involved could hardly be expected other than through experiments. This approach did not appear highly promising at first as there was reason to believe that the condition depends on idiosyncrasy, that is a peculiarity—probably constitutional—of certain individuals. Nevertheless, Nestler (1904) and Low<sup>6</sup> (1924) were able to sensitize some human beings to extracts of primrose, a plant at times causing persistent, irritating skin eruptions and a similar result was obtained with an alkaloid contained in satin-wood, another excitant of allergic skin affections. The experiments with Primula were repeated on a broader scale by Bloch and Steiner-Woulfisch<sup>7</sup> with almost invariable success. Hence, while under natural conditions only a few



among the many who handle Primulas become sensitive, intense treatment with concentrated extracts was shown to sensitize practically any individual and, in this case at least, a typical instance of idiosyncrasy, as Bloch remarks, was proved to be an acquired allergic state.

In guinea pigs, likewise, regular results were obtained with Primula extracts, and also with the isolated crystalline active substance, primine of the composition  $C_{14}H_{15}O_3$ , and similar effects have been observed lately by Simon, Simon Rackemann and Dienes<sup>8</sup> on application of poison ivy. The toxic principle in this plant is the same as in Japanese lacquer. The substance, urushiol was found by Japanese workers to be a catechol with an unsaturated side chain of the formula  $C_6H_3(OH)_2C_{15}H_{27}$ . By applying it to the skin of guinea pigs we had no difficulty in producing sensitization.

Among other substances that have been tested in animals with positive results mention may be made of arsphenamine,<sup>9</sup> known upon occasion to cause accidents on therapeutic administration phenylhydrazine,<sup>10</sup> and para-phenylenediamine,<sup>11</sup> widely used for dyeing pelts which gives rise to skin eruptions in persons wearing furs and asthma in dress and furriers. Here the affinity for proteins—utilized in the dyeing process—may well account for the formation of antigenic products in vivo.

However, the experiments carried out with various chemicals were in part not clear-cut or not easily reproducible. An illustration of the difficulties is the experience of Sulzberger and Mayer.<sup>12</sup> While these investigators had secured definitely positive results with arsphenamine in a laboratory in Germany, they were unable to sensitize guinea pigs in New York even though they used the same technique and the same brand of the drug as before. Similar inconsistencies were encountered in the experiments with phenylenediamine. Further studies led Mayer and Sulzberger to the opinion that the diet is of significant influence in determining the outcome of the experiments, as green fodder was said to render the animals resistant, dry fodder having the opposite effect while Simon<sup>13</sup> recently reported the necessity of vitamin C in the diet. But it appeared that not counting individual variations there may be other unknown factors responsible for the observed discrepancies. Still greater uncertainty obtains as to the possibility of sensitization after the fashion of passive anaphylaxis by injecting the serum of hypersensitive patients into animals. This claim advanced by several authors is the more questionable for the reason that even transfer of drug sensitivity from man to man succeeds only exceptionally if at all in contrast to that other class of human allergies of which sensitivity to pollens is an example where there are antibodies

which sensitize the skin of normal individuals. It is not surprising from the foregoing that in current textbooks the matter of drug hypersensitivity in animals is briefly dismissed or for the most part treated with scepticism.

In taking up the subject<sup>14</sup> it was the first concern of Dr. Jacobs and myself to find suitable, readily accessible substances and to establish a method that would furnish consistent results. Aided by previous studies of Kolle,<sup>15</sup> a technique answering the purpose was found in repeated intracutaneous injections of very small quantities of the chemicals or application of solutions to the intact surface of the skin. In this way definite sensitization effects were obtained with numerous and diverse substances. As examples of very active compounds, I may cite para-nitrosodimethylaniline and 2,4-dinitrochlorobenzene. For instance, in a representative experiment a lot of six guinea pigs was injected intracutaneously for 8 days, each time with 1/400 milligram of dinitrochlorobenzene, 1/50 milligram in all. After a rest period of 3 weeks, a drop of a 1 per cent solution in oil was spread on the skin. Some hours later reactions became apparent, and on the following day the treated sites showed pale to intensely pink coloration, at times with a distinct thickening of the inflamed area. The same treatment caused no change or a negligible one in the skin of normal controls. In a number of experiments made in this or a similar manner the result was definitely positive with sixty-nine animals and doubtful with four only. Hence as regards regularity the method compares with the standard anaphylaxis experiment and the comparison extends to the specificity of the reactions, the duration of the allergic state and the small quantities of substance, e.g., 1/250 milligram, which are sufficient to induce an increase in sensitivity. A significant difference between the two conditions lies in the fact referred to above that, in drug allergy, direct evidence for the presence of antibodies is still wanting. Yet the existence of some sort of antibodies, perhaps fixed in or on the cells is not disproved by the failure to demonstrate them with the usual methods and antibodies would indeed most readily explain the spreading of sensitivity all over the skin after injection into one site.

The choice of dinitrochlorobenzene was suggested by the frequent occurrence of allergic skin eruptions in industrial workers exposed to the compound,<sup>16</sup> and our sensitization experiments have been confirmed in human beings.<sup>17</sup> The skin lesions in man are similar in character to those produced in guinea pigs but there is a striking disparity in degree and in the range of individual sensitivity. Tested in the same manner by means of putting drops of alcoholic solutions in decreasing concentrations

on the skin, well sensitized guinea pigs were found to react to dilutions of 1:100 and 1:1000 like the majority of allergic persons. But some people give reactions with solutions of 1:100,000 or even 1:1,000,000 while the experimental animals have never shown so high a degree of sensitivity and so much individual variation. Anticipating genetic studies this would indicate wider constitutional differences in man in con-

sensitive to the diamine. The subject, nevertheless, is still in a state of obscurity so that the excitant drugs and chemicals have recently been pertinently described by a writer of authority as "a whole series of chemical compounds which seem to have no characteristic or common structure." The observations on 2,4-dinitrochlorobenzene led to the question precisely why this compound should be a powerful sensitizing agent

TABLE 1

Substance	K*	Reaction with Aniline <sub>1</sub>	Sensitization
1 2 4 Chlorodinitrobenzene	0.110 (0°) 3.26 (15° eth)	+	Positive
1 2 4 Bromodinitrobenzene	1.89 (15° eth)	+	Positive
1 2 4 Iododinitrobenzene	0.455 (15° eth)	+	Positive
1 2 4 Fluorodinitrobenzene	686.0 (15°)	+	Positive
1 4 2 6 Dichlorodinitrobenzene	0.0248 (0°)	+	Positive
1 3 4 6 Dichlorodinitrobenzene	1.20 (0°)	+	Positive
1 2 4 6 Chlorotrininitrobenzene	Very great† (0°)	+	Positive
1 3 5 Dichloronitrobenzene	Reaction irregular‡	—	Negative
1 4 2 Dichloronitrobenzene	0.00000297 (0°)	—	Negative
1 2 4 Dichloronitrobenzene	0.0000183 (0°)	—	Negative
p-Chloronitrobenzene	0.000000987 (0°)	—	Negative
p-Dichlorobenzene	0.00019 (175°)	—	Negative
1 2 4 Trichlorobenzene	Very small§ (0°)	—	Negative
1 2 4 5 Tetrachlorobenzene	Very small§ (0°)	—	Negative
Hexachlorobenzene	Very small (175°)	—	Negative

\*Constants from the literature for the velocity of decomposition of the substances by sodium methylate or sodium ethylate (eth) at the temperature indicated

$$K = \frac{x}{A(A-x)t} \quad (A = \text{initial concentration} \\ x = \text{Cl liberated} \\ t = \text{time})$$

†Velocity too great to be measured

‡Formation of azoxy compound

§Value found to be very small less than or of the same order as that for 1 2 4 dichloronitrobenzene

||The symbol + designates almost complete liberation of halogen (more than 90 per cent) and the symbol — indicates that no or very little (less than 5 per cent) halogen was replaced

trast to animals, relative to the predisposition to sensitivity either in general or concerning particular compounds. With less active substances or when exposure is not so intense as, for example, among factory workers, only occasionally may a person become affected and such a case will be set down as idiosyncrasy. Consequently, restricting ourselves at this moment to the drug allergies under discussion, we may, with Doerr, conclude that only gradual differences exist and that no sharp line can be drawn between normal and idiosyncratic individuals. A contrary view is held concerning another type of allergic affections—hay fever, asthma, nutritional eczema—characterized by Coca as due to a special sort of antibodies and depending strictly on heredity.

In the further course of our study various substances were examined in order to ascertain if possible relationships between chemical properties and sensitizing capacity. This point was touched upon some years ago by R. L. Mayer who found that a number of aromatic substances, supposedly related to phenylenediamine in that they are changed into quinoid compounds by oxidation, evoke allergic responses in persons

and suggested the examination of allied substances.

According to the theory of benzene substitution more than 90 chloro and nitro-substitution products of benzene are possible and most of these have been synthesized. Seventeen of the compounds were examined for sensitizing capacity, and seven yielded distinctly positive effects. It being known that 2,4-dinitrochlorobenzene contains a labile chlorine easily detached by alkali and that it correspondingly forms substitution compounds with organic bases, phenols, thiols and amino acids, it was obvious to compare the results of the animal experiments with the chemical data on the lability of the substituents in the substances examined. These can be grouped according to whether alkali splits off a chlorine atom or a nitro group. The reaction constants for the first group are assembled in table 1.

As is seen at a glance the figures indicating the velocity of decomposition by alkali in alcoholic solution are much higher for the sensitizing compounds. In the second group (table 2) there was an exception. The two trinitrobenzenes, the 1 2 4 and the symmetrical (1 3 5)

timetrobenzene alike in chemical structure except for the position of one nitro group showed a marked difference in the animal experiment. Thus, in several batches of guinea pigs injected intracutaneously with the 1,2,4 compound all showed definite or at worst slight allergic reactions while identical treatment with the symmetrical compound failed to produce any signs of sensitization. Yet in the latter case the reaction constant is greater than that of several "positive" substances. This inconsistency vanished when the reactivity was tested not with alkali but with an organic base. Using aniline it was now found that all positive substances

cutaneously to the chloride died, with the characteristic symptoms of anaphylactic shock. The same treatment therefore had induced skin sensitivity of the contact dermatitis type and on the other hand, anaphylaxis such as is elicited by natural or altered proteins. In these experiments anaphylactic effects ensued following injection of a conjugated protein in analogy to our results on sensitization with azoproteins. But it is a point of importance that we now know an instance where sensitization as well as anaphylactic shock can be produced by a synthetic chemical, i.e. arsphenamine. The somewhat controversial literature

TABLE 2

Substance	Ko*	Reaction with Aniline‡	Sensitization
1,2,4 Dichlorodinitrobenzene	0.326	+	Positive
1,3,2 5 Dichlorodinitrobenzene	0.145	+	Positive
1,2,4 Trinitrobenzene	Very great†	+	Positive
1,3,5 Trinitrobenzene	1.57	—	Negative
m Dinitrobenzene	Reaction irregular‡	—	Negative

\*Constants for the velocity of decomposition of the substances at 0° C by sodium methylvate.  
†Velocity too great to be measured.  
‡Formation of azo compound.  
§Th symbol — indicates the formation of a substitution compound and the symbol — formation of an addition compound.

but none of the negative ones gave stable substitution compounds. In particular 1,2,4 trinitrobenzene gives off nitrous acid and is substituted to yield a dinitrodiphenylamine while the symmetric isomer forms a loose molecular compound from which it can easily be recovered.<sup>19</sup> Assuming the apparent parallelism between chemical and allergic reactivity to be significant one should be able on chemical grounds to detect sensitizing compounds. Indeed the expectation that benzyl chlorides would have the capacity of sensitizing by virtue of a loosely bound chlorine atom was fulfilled and the results obtained with benzyl chloride and several derivatives were quite similar to those described above. It was not difficult, then, to find another group of sensitizing substances, namely the acyl chlorides, generally used for acylation of amino or hydroxyl groups. The skin sensitization method by means of para chlorobenzoyl chloride (or benzoyl chloride) again took the regular course the treated animals showing superficial dermatitis on application of oil solutions. Concurrently an unusual effect was seen on intracutaneous administration. Injections of small quantities—1/100 mg—dissolved in oil were followed by reddening and intense swelling over a large area, with central necrosis resembling the lesions in animals repeatedly injected with proteins. We proceeded then to test a compound prepared by combining serum protein with chlorobenzoyl chloride. On intravenous injection of this acyl protein guinea pigs sensitized intra

we need not consider and it will suffice to note that by a special mode of treatment we were able to sensitize guinea pigs to arsphenamine so that, in a large proportion of the animals, acute anaphylactic death followed intravenous injection of the substance. Clearly, the results obtained with substituted benzenes and acyl chlorides afford conclusive evidence for the view that sensitization with simple compounds may result because of the formation of antigenic conjugates in the animal.<sup>20</sup> Several problems require further investigation. In the cases in which the formation of conjugates seems indubitable we are not sure about the nature of the components derived from tissues or body fluids which serve to confer antigenicity upon the excitants since recent studies indicate that nonprotein substances, such as carbohydrates alone or linked to lipoids, may be endowed with antigenic activity. More serious difficulties may be encountered in the instances where experimental data are lacking, there being numerous excitants of human allergy with which one has not been able, so far, to sensitize animals. And, as remarked before often the chemical composition and properties of the substances reveal nothing obvious to allow a sound opinion concerning the reactions that may give rise to composite antigens. Yet there is always the possibility of chemical changes in the body preceding the union and it should be considered that with certain substances mere admixture

\*This should not be taken to imply that the process need be fully equivalent to immunization with conjugated proteins made in vitro for instance the mechanism may differ in that conjugation occurs within cells (1 a)

on the skin, well sensitized guinea pigs were found to react to dilutions of 1 100 and 1 1000 like the majority of allergic persons. But some people give reactions with solutions of 1 100 000 or even 1 1,000,000 while the experimental animals have never shown so high a degree of sensitivity and so much individual variation. Anticipating genetic studies this would indicate wider constitutional differences in man in con-

sensitive to the diamine. The subject, nevertheless, is still in a state of obscurity so that the excitant drugs and chemicals have recently been pertinently described by a writer of authority as "a whole series of chemical compounds which seem to have no characteristic or common structure." The observations on 2,4-dinitrochlorobenzene led to the question precisely why this compound should be a powerful sensitizing agent

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||The symbol + designates almost complete liberation of halogen (more than 90 per cent) and the symbol — indicates that no or very little (less than 5 per cent) halogen was replaced

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THE TREND OF PREVENTION, THERAPY AND  
EPIDEMIOLOGY OF DYSENTERY SINCE THE DISCOVERY  
OF ITS CAUSATIVE ORGANISM\*

BY KIYOSHI SHIGA, M.D.

THE discovery of the dysentery bacillus had stirred my young heart with hopes of eradicating the disease and saving the sufferings of about one hundred thousand cases that occurred yearly in my country at that time. Thirty-eight years have passed since this stirring event. Many thousand people still suffer from this disease every year, and the light of hope that once burned so brightly has faded as a dream of a summer night. This sacred fire must not die out.

I recall an address by Dr. Simon Flexner, my esteemed friend for many years, delivered some years ago at the Commencement of Cornell University Medical College. "The only distinction between 'clinical' and 'laboratory' science is that the former is more difficult to attain." In the same sense I may say that practical application is more difficult to attain than the search for the causes of disease.

My interest has always been focussed on studies of dysentery and I have followed closely the progress made by others. Today I wish to discuss briefly the bacillus, the therapy, the epidemiology and the prevention of dysentery in Japan.

## I. NOMENCLATURE OF THE DYSENTERY BACILLUS

Many meritorious researches on dysentery bacillus made by Flexner and Strong in Manila, and Kruse in Germany should particularly be mentioned. A large number of variations and types have been reported since then and they are included under the name of dysentery bacillus. When the bacillus was discovered there were only bacillary and amebic dysenteries. Just as the natures of the causative organisms of the two are different, so the symptoms and modes of infections are entirely dissimilar. Consequently therapy and prevention must be instituted on different bases. For instance, in amebic dysentery ipecacuanha was thought specific at first and then emetin was discovered and finally, at present, yatren has been introduced. On the other hand, except for antitoxin, no specific method of treatment has been found for bacillary dysentery.

Strains of the dysentery bacillus discovered and studied by many investigators have been called by many different names depending upon differences in immune reactions or in fermenta-

tion of various carbohydrates. Some strains bear the names of the discoverers, or the places where the discoveries have been made, while others bear signs and symbols. They amount nearly to more than one hundred, and it would be almost impossible to remember them all. Among those who have attempted to systematize and classify the confusions of the nomenclature, Hiss and Russell stand out above all the rest. They classified the bacillus into four types according to its characteristics of toxin production and its affinity for mannite and carbohydrates. One is known as the Shiga type and the other three belong to so-called Flexner types. This classification is very convenient and appropriate.

In recent years other types of the dysentery bacillus have been reported, which could not very well be included in the foregoing classification. One is the Schmitz bacillus and the other is the Kruse-Sonne bacillus. In Japan the former had been known long before it was described by Schmitz. It was in 1907 that Dr. Ohno studied 5 strains of it and described its biologic characteristics very carefully. Since then many reports have appeared (Tsumura, 1 strain in 1908, Nishihara, 2 strains in 1913, Maunuma, 3 strains in 1916, and Shinai, 9 strains in 1916, and so forth). On account of the nonacid and nontoxic nature of this type, I proposed to include it in the class of the metadysentery bacillus as will be seen in table 1. Some men think that the so-called Schmitz bacillus is an intermediate or transitional form between Shiga and Flexner bacilli or a variation of one or the other. Rutschko (Charkow, 1933) attempted to prove experimentally that the dysentery bacillus would undergo mutation in the intestines of chickens or cats. Whether or not the dysentery bacillus undergoes mutation to the metadysentery type or vice versa has not been conclusively proved.

Before discussing the Kruse-Sonne bacillus I shall briefly describe dysentery and ekari of children in Japan. We have many references to these diseases dating from early years. Ekari (perhaps similar to the so-called summer diarrhea of children in the United States) in particular has been regarded as the most dreaded disease of children from its fulminating course and very high mortality. It begins with a sudden high fever followed immediately by convulsions and vomitings and within 24 to 48 hours from the onset the child passes away. Children of 4 to 6 years old are especially sub-

\*Read at the Harvard Tercentenary Conference of Arts and Sciences, Cambridge, September 10, 1935.

†Shiga Kiyoshi—Professor of Medicine, University of Tokyo. For record and address of author see "This Week's Issue" page 1-50.

with proteins was found to be sufficient for the formation of loose antigenic combinations.<sup>19</sup> That such processes might play a part in sensitization is suggested by the recent report of Haxthausen<sup>20</sup> on allergy in human beings following treatment with metal salts in combination with a foreign protein.

Another problem relates to the special role of the skin, repeatedly noticed both in sensitization and allergic reactions to drugs. This appears from the fact, already pointed out by Low, that sensitivity to poison ivy or Primula, as a rule, does not involve the mucous membranes. Likewise in animals, administrations by routes other than the intracutaneous proved less effective or not at all successful in eliciting skin sensitivity.<sup>21</sup>

In spite of all the open questions it may be taken as established from the foregoing that drug idiosyncrasy, in many instances at least, comes into the same category as anaphylaxis.

There doubtless exist material differences, as viewed from clinical and theoretical angles, between various types of human allergy, conditional upon the nature of the exciting substances, the tissues involved in sensitization and allergic response, and factors—constitutional or otherwise—peculiar to the individual. Widespread, and occurring in many shapes and disguises, allergy is a concomitant of infections, a predominant source of industrial disease, it causes discomfort as in hives and serum sickness, or serious illness as with asthmatics; it may be associated with the presence of readily demonstrable antibodies while in other cases the elucidation of its mechanism still awaits patient experimentation. Yet we have gone far enough to regard with reasonable assurance idiosyncrasies and allergic affections in general as manifestations of the very comprehensive and remarkable biologic phenomenon of adaptation, namely the adaptation of the organism to chemical agents by means of specific antibodies circulating or fixed in tissues. If successful, this mechanism guards against infectious disease but when it misfires it induces sensitivity to minute quantities of proteins or simple chemical compounds. This, in short, sums up the substance of our present knowledge.

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#### DISCUSSION

DR. SANFORD B. HOOKER, Boston. I appreciate this honor, Dr Zinsser, and I shall be very brief.

There is nothing in the matter of Dr Landsteiner's paper that lends itself to any controversial discussion. What Dr Landsteiner says in public he can prove. He has made a very convincing addition to our understanding of one of the many different kinds of allergic reactions.

There is one question that I should like to ask if it is permitted which may have some theoretical importance. I do not know that your experiments have gone far enough to allow you to answer the question which is this. In these animals that were rendered anaphylactic by the injection of this simple benzoate of chloride was it possible passively to transfer the epidermal sensitivity?

DR. LANDSTEINER. We have not had definite results as yet. We are trying to examine this question. I think it ought to be possible to transfer passively the anaphylactic sensitivity because it is exactly the same as when you inject a protein.

and metadysentery bacilli from 3 cases. In 19 cases the antitoxin containing 160 A U in 1 cc was tried. In 1926 antitoxin containing 200 A U was tried on 12 cases of Shiga type, while in 1927 it was tried on 8 cases. This serum contained 300 to 400 A U. The effects were favorable. The effective therapeutic units of antitoxin were found to be as follows: For mild cases, 3,000 to 4,000 A U, for moderate cases, 6,000 to 10,000 A U, and for severe cases 10,000 to 12,000 A U.

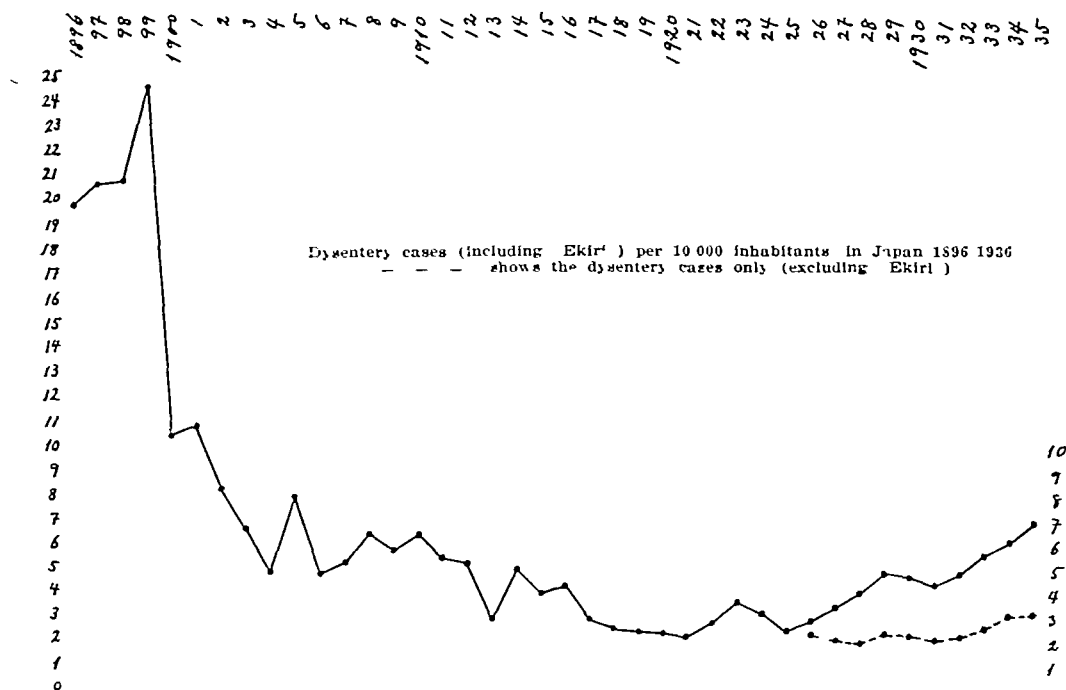
In the foregoing trials it was found that the dysentery antitoxin was especially effective in the treatment of mild and moderate cases but for severe cases it was less effective. The

be found for these types, but of its nature there is as yet, no hint whatever.

### III. EPIDEMIOLOGY OF DYSENTERY

At the time when the dysentery bacillus was discovered in 1898 there were 90,000 to 100,000 cases yearly in Japan. Since 1900, however, it decreased to 30,000 to 50,000 and since 1910 was still further reduced to 20,000 to 30,000. In the last few years it again increased to 30,000 to 40,000. The picture is still more vivid when the trend of the epidemics is shown according to the rate per 10,000 population. In 1898 it was 20.81 cases, and in the next year reached the record rate of 24.59, which suddenly dropped

TABLE 2



reason why it was not effective in the severe cases may be explained by the fact that dysentery toxin acts upon the peristaltic centers of the intestinal walls, and when paralysis of the intestinal walls has set in the antitoxin has no power to neutralize the toxin. Experimentally it was found that a mild toxin stimulates peristalsis and causes diarrhea but, when a strong toxin continues to act it paralyzes the walls. In the later stage the serum treatment becomes ineffective. Naturally it may be thought that a stronger antitoxin might be more effective. At the Kitasato Institute an antitoxic serum of 400 A U per cc has been prepared but it is at present not difficult to produce a serum containing 500 A U. The serum treatment is not effective in meta- and paradysenteries.

Some other methods of specific treatment must

to 10.35 in 1900. After that year it gradually decreased with narrow fluctuations until 1920, when it reached the lowest level of 2.27 cases, then it again assumed the upward trend, and in 1935 was 7.07 cases (table 2). This increase is mainly explained by the fact that since 1923 ekiri has been added to the list of reportable diseases and cases of ekiri have been included in the category of dysentery (table 3).

The sudden decrease of dysentery in 1900 I do not claim should be attributed to the discovery of the bacillus. The gradual decrease since then must have been due to the adoption of a new policy of prevention based upon the discovery of the dysentery bacillus.

Next I shall touch upon the problem of carriers.

(a) Carriers of the Dysentery Bacillus. Du-

ject to the disease, and the mortality is as high as 70 to 80 per cent. Dr. Ohara in 1914 isolated an organism and reported it as the causative agent of ekiri. Professor K. Mita in Kiushiu University during 1913 to 1918 isolated a strain from the stools of 21 cases out of 200 dysenteric children and named it the paradysentery bacillus. These two strains were found to be identical and the organism has been recognized as the causative organism of ekiri; it is known as the Ohara-Mita bacillus. Later it was proved to be identical with an organism described by Sonne in 1915.

During the past 38 years the causative organisms of dysentery have been almost completely investigated. But the nomenclature and the classification are still in confusion. Science is international and the nomenclature of the dys-

toxin and enterotoxin in animal experiment as well as in neutralization with the immune serums. Dysentery toxin produces antitoxin. This contradicts the idea we had hitherto held in regard to an endotoxin. Therefore we must accept the view that there are some endotoxins which produce antitoxins. The potency of the toxin as tested in animals places it next to tetanus and diphtheria toxin in strength. Tetanus toxin in a quantity of 1/10,000 cc kills a mouse weighing 15 grams. Therefore 1 cc of it kills 150 kilograms of mice. One cc of diphtheria toxin kills 25 kilograms of guinea pigs, while one cc of dysentery toxin kills 20 kilograms of rabbits.

Attempts to prepare a toxoid of dysentery toxin have not been successful so far and the hope of using a toxoid for prevention of the dis-

TABLE 1

Type	I Dysentery Bacillus	II Metadysentery Bacillus				III Paradysentery Bacillus
	Shiga	(a) Ohno-Schmitz	(b) Flexner	(c) Y	(d) Strong	Kruse-Sonne, Ohara Mita
Indolreaction	—	+	+	+	+	—
Mannite litmus	blue	blue	red	red	red	red
Lactose litmus	blue	blue	blue	purple	blue	red
Dextrose litmus	red	red	red	red	red	red
Maltose litmus	blue	blue	red	red	blue	(red or blue)
Saccharose litmus	blue	blue	red (blue)	blue	red	blue then purple
Dulcitate litmus	blue	blue	blue	blue	blue	blue
Katalose litmus	—	+	+	+	+	+
Milk		No coagulation				Coag after 6-22 days
Dextrose		No gas production				
Specific Toxin	+	—	—	—	—	—

entery bacillus must also be scientific. It should not bear the names of the discoverers or the investigators. In 1933 I suggested the following classification. I believe that such a classification is appropriate and fulfills all the requirements of conditions that are presented.

I B Dysenteriae (representative strains are Shiga-Kruse bacillus), includes toxin producing and nonmannite fermenting organisms.

II B Metadysenteriae (representative strains are Flexner, Strong, Y, Ohno, Schmitz bacilli) includes mannite fermenting nontoxin producing organisms.

III B Paradysenteriae (representative strains are Kruse-Sonne, Ohara-Mita bacilli) includes lactose fermenting, milk coagulating and variant colony forming organisms. (See table 1.)

## II TOXIN OF THE DYSENTERY BACILLUS AND ANTITOXIN TREATMENTS

Dysentery toxin by its nature belongs to the endotoxins and is a constituent of the bacillary body. At its death the toxin is liberated into the surrounding medium. Dr. Kawamura in my laboratory (1930) was unable to separate the dysentery toxin (Shiga type) into neutral

ease must be abandoned at present. Following the discovery of the bacillus, I prepared an immune serum with the organism and tested for the anti-infection titer. This serum was used for treatment of the disease with some favorable results. Later the toxin was found and antitoxin prepared. At the Serum Conference in Geneva in 1924, the method of testing and the unit of antitoxin were adopted. Thus the antitoxin treatment for bacillary dysentery has been recognized by the League of Nations. Here upon it became necessary to determine the therapeutic value and dose of the antitoxin. During the three years between 1925 and 1927, I tried the antitoxic treatments at Keijo, and the results were reported to the League. In recent years the Shiga type of dysentery has almost disappeared in Japan proper. The most prevalent type has been metadysentery and the next paradysentery. Consequently it was impossible to try the serum treatments in Japan. Fortunately I was in a position to have opportunities for testing antitoxin of the Shiga type in the dysentery cases at Keijo.

In 1925 among the 22 dysentery cases hospitalized in the Keijo City Hospital the Shiga type of organism was isolated from 19 cases.



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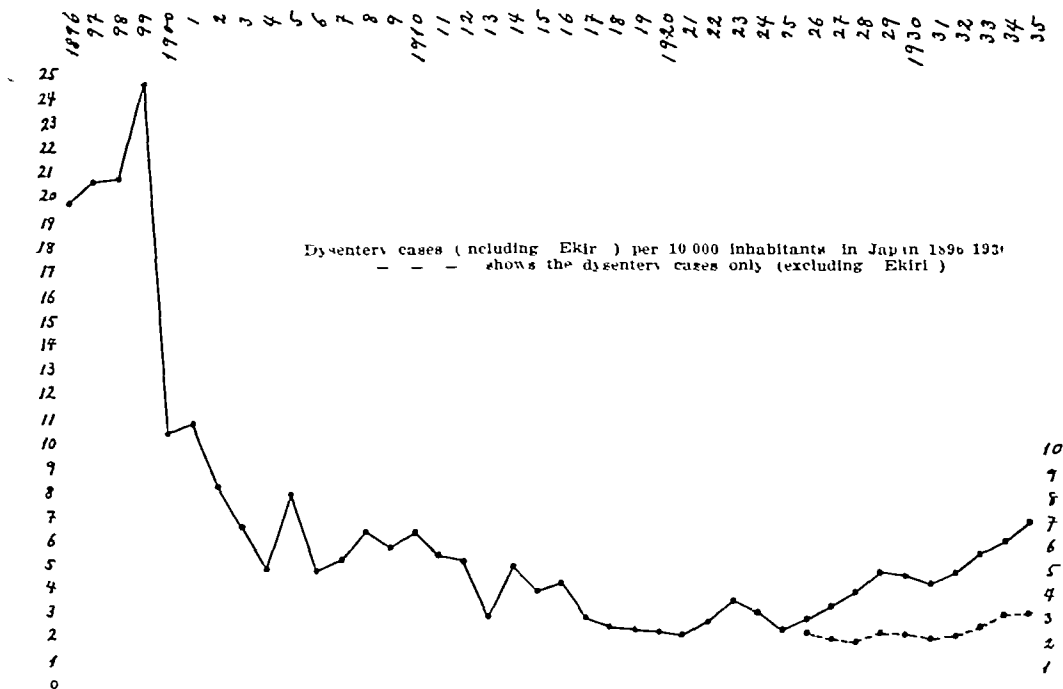
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ing the first period, between 1897 and 1910 of my studies of dysentery the majority of the patients were infected with the dysentery bacillus Shiga type. Later the metadysentery bacilli, Flexner and Strong types, began to appear in

TABLE 3

THE FOLLOWING TABLE GIVES THE CONDITION OF DYSENTERY SINCE 1896

Years	Dysentery (Including Ekiri)	Ekiri (Only)	Cases per 10 000 Inhabitants
1896	85 876		19 74
1897	91 077		20 53
1898	90 976		20 81
1899	108 713		24 59
1900	46 255		10 35
1901	49 635		10 97
1902	36 996		8 08
1903	30 311		6 50
1904	22 772		4 82
1905	37 988		7 93
1906	22 277		4 59
1907	24 942		5 08
1908	32 809		6 38
1909	28 006		5 61
1910	31 960		6 33
1911	27 466		5 37
1912	25 667		4 96
1913	16 779		3 20
1914	26 127		4 87
1915	21 137		3 88
1916	22 452		4 07
1917	14 942		2 67
1918	13 997		2 46
1919	12 915		2 30
1920	12 728		2 27
1921	12 445		2 19
1922	15 134		2 62
1923	20 266		3 47
1924	18 646		3 17
1925	14 719		2 46
1926	17 132		2 83
1927	21 380		3 49
1928	11 418	13 773	4 06
1929	30 253	15 339	4 81
1930	29 680	16 091	4 61
1931	29 655	16 697	4 54
1932	32 251	18 345	4 86
1933	38 049	20 580	5 66
1934	42 952	22 033	6 30
1935	42 952	24 014	7 07

many cases, and in recent years the Shiga type practically disappeared, while the paradysentery bacillus began to appear in Japan. The Shiga type, however, is prevalent in Chosen.

Why has the dysentery bacillus been replaced by the meta- and paradysentery bacilli? How could such a phenomenon be explained? No convincing explanation can yet be offered. One may surmise that the number of cases of the dysentery bacillus is small because its carriers are few, and likewise the number of the meta- and paradysentery cases is large because the number of their carriers is large. Some men may reply that such a view inverts cause and effect. It may be so. The decrease or disap-

pearance of the dysentery bacillus may be attributed to the law of survival of the fittest in commensal life in the intestines. I shall refer to it later.

Carriers were studied in Tokyo by the Metropolitan Police Bureau in 1935. It was reported that, (1) 30 per cent of the convalescents were found to excrete the organisms for a long time. Some excreted it over 8 months, (2) 91 per cent of the familial contacts were found to be carriers. A study made in Kanagawa Prefecture has shown that there was a convalescent case that continued to excrete the organisms for 310 days. Dr. Kanasawa of the Navy Department reported convalescent cases that continued to be carriers for 196 to 324 days. There was a case also in the Navy that, by a reliable history, was shown to be a carrier for over 4 years. In the Navy, in attempts to detect the carrier, a proctoscope was used to find ulceration in the lower parts of the large intestine on the supposition that the ulcers were the hidden seats from which the organisms were liberated continuously. Treatment of the ulcer was expected ultimately to cure the carrier condition. Figures on dysentery cases show that about 75 per cent of the total are under the age of 10, while one quarter of the total carriers are found in the same age group. This indicates that children are less resistant to dysentery. The susceptibility of children can be explained by the physiologic function of the intestines. In the small child the functions of the small and large intestines are not yet differentiated. Consequently in dysentery or ekiri of children, both intestines are inflamed diffusely, while in adults the seat of the pathologic changes is usually confined to the colon and rectum. Exactly the same relations are demonstrable experimentally in rabbits. When the pathologic changes are limited to the large intestine the course is mild, but if the small intestine is also involved it is very severe. The high mortality and the fulminating course of ekiri are thus explained.

(b) Prevalent Types of Dysentery in the Carriers and Cases. We have mentioned the fact that there are many carriers of the meta-dysentery bacillus. Some have said that this represents only a relative increase due to the absolute decrease of the cases caused by the dysentery bacillus. But I rather think that the large number of carriers of the former account for the prevalence of cases of this type. The epidemics of the latter no longer occur because its carriers are not found. Why then have the carriers of the dysentery bacillus decreased while those of the other type have increased? I believe that dysentery bacilli are readily overcome by the colon bacilli in commensal association in the intestines. On the

other hand, the metadysentery bacilli, since they are closely related by nature to the colon bacilli are able to maintain a commensal life with them. A large number of carriers naturally give rise to frequent epidemics. This supposition can be proved by comparing the length of life of dysentery, meta- and paradysentery bacilli in the intestines of experimental animals and by actual surveys of the frequency of each type of carrier in localities such as Keijo where cases due to dysentery bacillus are still prevalent. I shall have an opportunity to report on these points at some other occasion. It has been found by N Ogata and then by T Shibata that house rats are liable to become carriers of typhoid and dysentery bacilli. They believe that such a rat may be a source of dysentery infection. This view, however, is denied by Ido and others.

#### IV PREVENTIVE VACCINATIONS

How shall we deal with the carriers which are the sources of dysentery epidemics? They are just as difficult to deal with as typhoid carriers. Suppression of carriers may be an important problem, but suppression of the cases is more feasible by immunizing or increasing the resistance of the general population by vaccination.

My study of preventive vaccination in dysentery falls into three periods. In 1899, vaccine was prepared by killing the bacilli with heat. I tried it on myself and was frightened by its severe reactions. This was enough and I never tried it on others. The next attempt was the preparation of a sero-vaccine. It was found that the reaction was less severe and resorption was rapid. This was used on tens of thousands of people, but it was abandoned on account of dangerous sensitization of the people. The last method attempted was oral vaccination. In 1907 animal experiments were made with the dysentery bacilli. This method was recommended by Besredka later and is now used widely.

The theories concerning the local or cellular immunity developed by oral vaccination are not in accord. Professor S Mita found that a certain immunity was developed in the mucous cells of the intestine by oral administration of a protein substance. He called this phenomenon "habituation." When the mucous membrane of the intestines once takes up a certain protein it develops the power of resisting the same protein given subsequently. This property may be developed with pathogenic bacteria.

Oral vaccinations have been administered in Japan to hundreds of thousands of people during the last ten years. Though the results are claimed to be statistically favorable, careful consideration is needed before accepting them. It is necessary to investigate the methods of prepar-

ation and administration of the vaccine so as to secure better results.

#### V CONCLUSION

Medical science has progressed steadily with miraculous success in some branches in particular. My whole life as a bacteriologist has been devoted to the study of dysentery, but in looking back over the field where I have sowed and toiled for 40 years, I cannot help thinking that the prospect of the harvest is not in sight. We must turn to a more hopeful field.

In tuberculosis, tuberculin, irritants and chemical therapies have been tried and failed. The prophylactic treatments with B C G were tried in turn, but its effect is being watched with very cautious eyes. Diphtheria serum stands as the queen of all the serum treatments. But it did not reduce the diphtheria incidence very materially until antitoxin and toxin or anatoxin or the like were used for prophylactic purposes. Pasteur treatment had no material influence whatever on eradication of rabies until Umeno's preventive inoculations of dogs came into use.

We believe that the suppression of intestinal infectious diseases like typhoid and dysentery must rely upon the progress of modern public health practices. Here we find a beam of light directing us toward the goal which I had sought many years ago. It is a slow process to bring about the practical application of a scientific achievement. But it is a consolation and pleasure to think that we have devoted our efforts to humanity with an unselfish spirit of service, as Pasteur has said, "Until the time comes when you may have the great happiness of thinking that you have contributed in some way to the progress and good of humanity."

#### DISCUSSION

PROFESSOR F F RUSSELL, Professor of Preventive Medicine Harvard Medical School. Professor Shiga said that it was 38 years ago when he first discovered the Shiga bacillus of dysentery. That was of course in 1898, in the days when we were engaged in the Spanish War. As a young medical officer in the Spanish War I was of course tremendously interested in learning of this discovery of Professor Shiga.

We know that in the Civil War diarrhea, dysentery and chronic diarrhea were the principal causes of illness of disability and of wastage of troops. And so at the beginning of the Spanish War we hoped as the result of this discovery of Professor Shiga that we would be able to control dysentery better than we had previously.

The methods which Professor Shiga used at that time were extremely simple, as of course were all the methods in bacteriology in 1898. He isolated many of the organisms that were discovered in dysentery cases and called those dysentery bacilli which were agglutinated by the serum of convalescent patients. That very simple and very exact method of work was the only method we had in those days.

the agglutination of dysentery bacilli in convalescent serum

Thirty eight years have passed and during that time nothing has been taken away from this discovery of Dr Shiga's published in 1898. To be sure we have added new authorities and new supporters but everything that Dr Shiga said at that time stands true today. And that is not true of all discoveries.

Professor Shiga has said that the application of these discoveries to practical prevention of disease is difficult. Of course it is difficult and that is a thing which one does not always appreciate as Professor Shiga appreciates it. The application of a discovery to the protection of public health demands the cooperation of so many different authorities so many different classes of workers.

In the course of time we have come to a realization that the enteric intestinal diseases are matters of sanitary engineering in their prevention that is sanitation improvement in sanitary engineering proper water supply proper milk supply proper disposal of excreta and proper treatment of sewage. All of these are essential and their adoption has diminished intestinal diseases in an astonishing way.

The respiratory diseases on the other hand have not diminished. We have no simple method of control of respiratory diseases and these diseases continue to prevail as influenza does at the present time. With the intestinal diseases however as Dr Shiga has said the public health people have made tremendous progress in cutting down the prevalence of these diseases.

The classification of organisms which Professor Shiga proposed some years ago is an eminently practical and scientific one. Because we have been in the habit of talking about the Shiga bacillus and the Schmidt bacillus and other named bacilli it will take some time to drop those names and to use a scientific nomenclature. That will come about in time however.

The three types of organisms which have been added are all different from the true Shiga in that they produce no toxolysin. Yet clinically they are indistinguishable except perhaps in the severity of the disease.

In this country we have gone through a long experience in the study of dysentery bacilli. Gradually we have come to know as in Japan that dysentery is no longer the terrible disease that it was. We no longer have dysentery epidemics affecting adults. We still do have dysentery however in children. One of the very troublesome things is the prevalence of these mild types of dysentery in mental hospitals. And they have been most difficult to control because of the character of the patients. We also have them in children's institutions. Nevertheless there has been a continual diminution. It is kept alive by carriers as Professor Shiga has said and there are many carriers. The carriers persist as carriers for a long period. However improved personal hygiene and improved sanitary engineering will gradually bring about a different condition.

It is rather curious that in the work of the sanitary engineers so little provision has been made for children either in luxurious houses or in primitive communities. To a great extent the sanitary engineer has forgotten to provide for the needs of the child. This resulted in the appearance of certain foci of the disease due to the fact that the children had been overlooked by the sanitary engineers and proper provision had not been made for their convenience.

The present classification is an eminently sound one and no doubt will come into use more and more.

It was interesting to hear Professor Shiga say that the Shiga type of dysentery had almost disappeared from Japan. Of course it has almost dis-

appeared from the United States. It is rather rare in the north and is not common anywhere. But there are foci of Shiga dysentery scattered here and there throughout the southeast. These have been described by Dr Holt of Charleston, South Carolina and the epidemiology of dysentery has been described by Bojlen of Copenhagen.

Bojlen had the benefit of an extremely well organized public health service and he was able to follow dysentery epidemics in villages and schools and even in farmhouses. As a result of his study he found many variations in the organisms, which proved to be an advantage rather than a disadvantage. In a particular village epidemic he found the type of organism to be pretty much the same. In another village it will be another type. In a mental hospital certain wards have a characteristic organism which will not be common to the whole institution. He found that in institutions where children and adults were brought new varieties of organisms are observed from time to time and that it is possible to have a superinfection so that a patient will be excreting not one variety but two varieties of organisms.

He found that the epidemiology as a study was facilitated by the variety of characters which the dysentery organisms had and in time they changed from one to the other.

The preventive vaccination that Professor Shiga spoke of shows that his experience has not been unlike our own in this country.

Vaccination against dysentery bacilli has not been a popular measure because the reactions were severe. That brings one to a realization of the fact that in enteric diseases vaccination while good in emergencies is not the logical way to prevent enteric diseases. The logical way of preventing enteric diseases is by sanitation and not by vaccination. Vaccination is good for emergencies. So that we can look forward to an improvement in the situation in regard to dysentery as we improve our sanitation and as we improve our personal hygiene.

Professor Shiga remarked that after working all these years of his life on dysentery the end was not in sight. While we may not have seen complete disappearance there has been a tremendous diminution in the number of deaths and the number of cases during Professor Shiga's lifetime. I think he is to be congratulated on the permanence of the work which he has done and on its influence throughout the world in the prevention of this disease among adults and children in a most effective and continuing way. While the work is not entirely completed it is well launched. We are better off each year and we know in general what to do.

I think we all appreciate Dr Shiga's effort in coming here and presenting this paper.

COLONEL JAMES SIMMONS, U. S. Army Medical Corps. In this period of world unrest and international bickering it is refreshing to hear the story of a famous scientist who has devoted his life so successfully to the service of mankind. Like many other great men Dr Shiga started his life's work with a vision. His dream of eradicating dysentery has not been realized but unlike most dreamers he has lived to see his labors rewarded by an appreciable improvement in world health and by the saving of innumerable lives.

The discovery of the Shiga bacillus in 1898 and the subsequent recognition of related species by others led to a clearer differentiation of the bacillary and the protozoan dysentery. Subsequent studies of the dysentery bacilli and the methods of their transmission indicated that these infections might be prevented by sanitary methods similar to those used for the prevention of typhoid. Dr Shiga's introduction of a serum for the treatment of dysentery

and his study and experimental work have led to the intensive use of such treatment throughout the world. While little is known as to the effectiveness of serum treatment in infections due to the Schmidt bacillus and while opinion is divided as to its effectiveness in certain other dysenteries there seems to be no serious doubt as to the effectiveness of antitoxin serums when used in the Shiga infection.

Preventive vaccination against dysentery was first presented by Dr Shiga and within a short time its possibilities were suggested by the experiments of Gale. Subsequent workers have produced a variety of vaccines many of which have been treated with antitoxic serum or with various chemicals in an attempt to neutralize the Shiga toxin. As General Russell has just stated the reports concerning the effectiveness of these vaccines from all over the world are not entirely convincing. There is however sufficient indication to justify their continued study and use.

To those of us who are connected with the medical department of the Army the prevention of dysentery is of special interest. The enteric group of diseases has always been notorious as a major plague with troops under field conditions. Undoubtedly dysentery has influenced the outcome of many of the decisive campaigns of the world. The records of the United States Army indicate that during the past hundred years there has been a downward trend in the incidence of these diseases except in periods of war or mobilization. The decrease has been more pronounced during the present century. During the Civil War in a force estimated at about two million men there were thirty seven thousand deaths from this cause. On the other hand during our participation in the World War the incidence of those diseases was lower than at any time in the history of the world. In a force of more than four million men there were reported ninety two thousand cases

of dysentery diarrhea and enteritis combined and out of those only about five thousand were recorded as dysentery either bacillary or protozoan. The mortality also was low. There were two hundred and sixty seven deaths attributed to the diarrheal diseases and only sixty nine to the dysenteries.

As our troops had not been vaccinated against dysentery this striking reduction must be attributed largely if not entirely to military sanitation although one is tempted to speculate as to whether the use of triple typhoid vaccine might not have assisted in some unrecognized way.

The question as to what might be accomplished by the use of an additional antidysentery vaccine cannot be answered at this time but it is possible that it might have caused a still further decrease in the dysentery infections. In view of the importance of these diseases and the present uncertainty as to the degree of protection afforded by the available vaccines this subject deserves further intensive study.

Our knowledge of the bacteriology and particularly the changes in the pathologic structure which occur during the growth of all organisms of the enteric group suggest lines of investigation which may lead to the development of more effective vaccines for prevention not only of dysentery but of typhoid and other related diseases.

Again I wish to thank Dr Shiga for the privilege of listening to his lecture and to express the hope that in the future his dream may continue to come true.

Dr. SHIGA: I believe I shall retire next winter and after I retire from bacteriology I suppose that dysentery will disappear.

[The scientists attending this section then divided into smaller groups and discussed the subjects informally.]

## CLINICAL AND IMMUNOLOGIC OBSERVATIONS IN CASES OF PNEUMOCOCCUS TYPE V PNEUMONIA TREATED WITH SPECIFIC ANTIBODY\*

BY MAXWELL FINLAND M.D.† AND R. CARMICHAEL TILGHMAN M.D.†

**D**URING the past winter and spring there was an appreciable increase over preceding years in the number of cases of pneumococcus pneumonia admitted to the Boston City Hospital. With this increase there was encountered an unusually large number of cases of pneumonia due to the Type V pneumococcus. We were fortunate in having available some concentrated antibody for this type during part of this season. Accordingly a limited number of cases seen early in the disease were treated with specific antibody. This paper concerns the clinical results of this therapy and serologic studies made in the serum recipients. While the number of cases treated with serum was too

small to warrant final conclusions as to its efficacy the uniformly beneficial effects observed following its proper use strongly suggested that we were dealing with a useful and effective specific therapeutic agent.

The Type V pneumococcus which is probably the same as the so-called Type IIa of Avery<sup>1</sup> is one of the most important of the newly classified types of pneumococci (Cooper). As a causative agent in the pneumonias of adults it is exceeded in frequency among these new types only by the Type VIII (atypical Type III) pneumococcus.<sup>2,3</sup> It has been identified as the probable inciting agent in certain institutional<sup>4</sup> and familial<sup>5</sup> outbreaks of pneumonia and other respiratory infections and is rarely found in the nasopharynx of normal individuals not in contact with cases of pneumonia due to this type.<sup>6,7</sup>

The clinical and bacteriologic features of infections with the Type V pneumococcus as observed at the Boston City Hospital have been reported elsewhere.<sup>8</sup> Briefly this organism like the Type II pneumococcus with which it is immunologically related was found to be associated with pneumonia with considerable regularity. The pneumonias due to both these types are characterized by a similar invasiveness as indicated by an incidence of bacteremia that is higher than in any other of the com-

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mon types, a high death rate and a similar age distribution. The pulmonary lesion was 'atypical' in a larger percentage of cases of Type V than of Type II pneumonias. Of all the pneumonias, 26 per cent of the Type V cases were "atypical" as compared with 4 per cent of the Type II cases. Among the autopsied cases alone, 48 per cent of the former and 26 per cent of the latter were "atypical" or bronchopneumonias. Purulent complications, diagnosed during life or discovered at autopsy, were more common among the cases of Type V pneumonias.

The antibody response to infections with the Type V pneumococcus unaffected by specific serum has also been reported.<sup>11</sup> Patients with pneumonia due to this type were found to develop homologous type-specific agglutinins and mouse protective antibodies with great regularity and in comparatively high titers at or about the time of recovery by crisis or lysis. Those that died failed to develop such antibodies. The importance from a therapeutic standpoint of the immunologic relation between Type II and Type V pneumococci was reemphasized (cf Cooper<sup>2</sup>).

#### PATIENTS, MATERIALS AND METHODS

**Patients.** The following criteria were used in the selection of patients for treatment with specific serum: (1) the patients were over 12 years of age and had clinical evidence of pneumonia, (2) a Type V pneumococcus was identified in the sputum or blood culture and (3) judging from the time of the initial chill or typical pleuritic pain, whichever came first, the patients were acutely ill not more than 96 hours at the time the type was determined. A total of 26 patients received serum, including 2 patients treated at other hospitals, and 1 that received the first injection of serum early in the fifth day (103 hours after the onset). Since November, 1929 when 'typing' serum for Type V was first made available here a total of 197 cases of pneumonia due to this type, in persons over 12 years of age have been treated at the Boston City Hospital without specific serum. These include, in addition to the 130 cases previously reported,<sup>12</sup> 67 adult cases admitted between June 1, 1935 and July 1, 1936. All but 7 of the latter cases were treated during the period of this study but these patients received no serum because none was available because the disease was of more than 4 days' duration when the type was determined or because the patient already had evidence of recovery by crisis or lysis.

**Bacteriologic Methods.** Rapid typing from sputum by the Neufeld method<sup>13</sup> was regularly verified by the stained slide microscopic agglutination method of Sabin<sup>14</sup> and by the older standard methods.<sup>15</sup> Pneumococci from the blood from purulent foci and from various sources at autopsy were isolated and typed. Venous blood was obtained for culture just before the first injection of serum regardless of whether previous cultures had been made. Subsequently blood cultures were made as indicated.

**Serologic Methods.** Blood was obtained for serologic studies before the first injection from 8 to 18 hours (usually on the following morning) after the last injection usually 1 week later and at other irregular intervals. In patients requiring additional courses of treatment further blood samples were obtained before and on the morning after such treatment. Tests for type-specific agglutinins and mouse protective antibodies were carried out as in previous studies.<sup>12</sup> The same strain of Type V pneumococcus being used. This strain was maintained at maximum virulence by daily mouse passage. In addition microscopic agglutinations<sup>16</sup> were done where a rapid qualitative result was desired and with all bloods that were obtained after specific

therapy and had failed to show floccular agglutination macroscopically. Freshly grown 8 to 12 hour rabbit's blood broth cultures were used as antigen for this purpose. Controls were carried out with the same serum, using Type VII and Types I or II pneumococci.

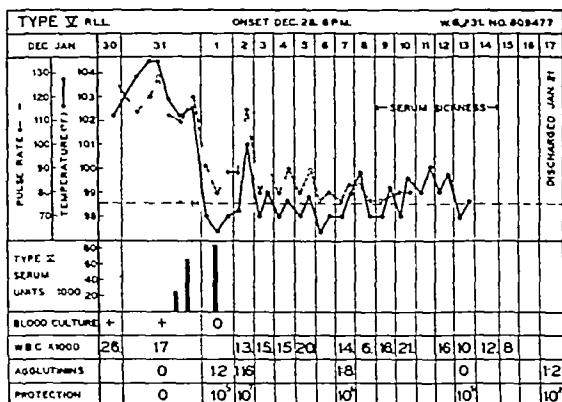
**Therapeutic Serum.** This was prepared from anti pneumococcus horse serum and was concentrated and supplied by the Lederle Laboratories, Inc. It was furnished in the form of a bivalent Types V and VII antibody, different lots varying in potency from 2500 to 5000 units of the Type V antibody per cubic centimeter. These preparations were titrated by a method similar to the one now in use for Types I and II antibody,<sup>17</sup> the unit of Type V antibody being taken as equivalent to that contained in 1/150 cubic centimeter of a standard serum (L 1).

The customary precautions were observed before serum was given including both the cutaneous and conjunctival tests with a 1:10 dilution of horse serum. The initial injection was usually 10,000 or 20,000 units followed, at intervals of 2 hours by 20,000 to 100,000 unit injections until the desired total was completed. The total dose was chosen arbitrarily and was sometimes curtailed because of the limited supply available. In general, it was planned to give about 80,000 units in each case and an additional 60,000 to 100,000 units if it was ascertained that the blood culture was positive the amount depending on the effect of the previous dose. In patients under 30 years of age smaller amounts were often used and found to be sufficient. Further amounts were given when available if the clinical response was not satisfactory. In 2 patients (cases 6 and 11) serum treatment was interrupted during the first injection because of severe allergic reactions and was not resumed. All of the serum was given intravenously.

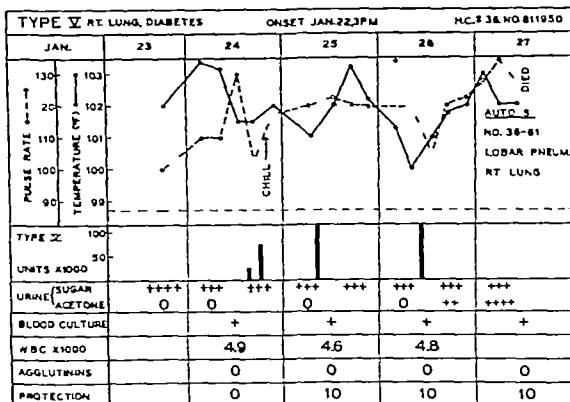
#### CLINICAL RESULTS

Some of the more important features of each of the serum treated cases are noted in the accompanying charts. In general, the changes observed in these patients after serum treatment were very similar to the effects following the use of specific antibody in patients with Type I pneumococcus pneumonia.<sup>17</sup>

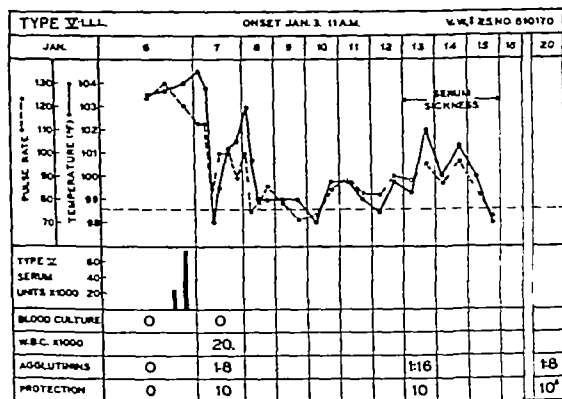
**Duration of the Acute Illness.** The average duration of the acute illness when treatment was begun was 65 hours. Among the 19 patients that recovered without purulent complications only 4 had fever for more than 18 hours after treatment with serum was begun. The average duration of fever, elevated pulse rate and symptoms of acute illness after the first injection of serum, exclusive of serum sickness, was less than 20 hours. Only 8 of 39 similar cases treated without serum during this time became afebrile and free of the same symptoms within 24 hours after admission to the hospital. The average duration of the acute illness after admission to the wards in these 39 cases was approximately 65 hours. All of the patients that recovered after serum treatment were free of the symptoms of acute pneumonia on the sixth day of the disease. Among those that recovered without receiving serum, on the other hand, two-thirds of the patients were acutely ill on the sixth day and one half of the patients



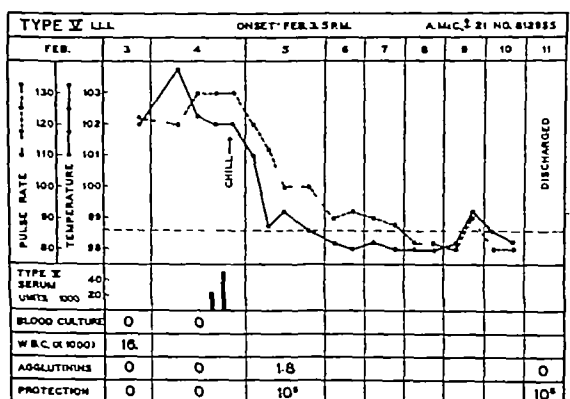
CASE 1



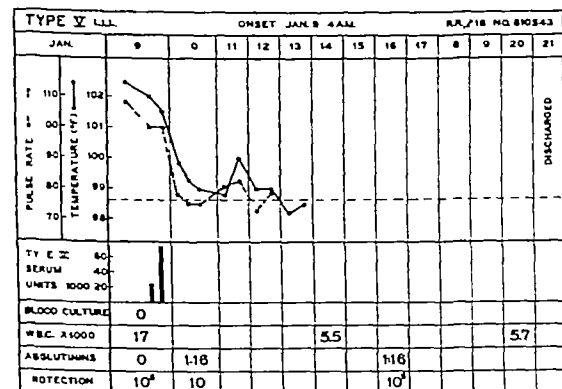
CASE 4



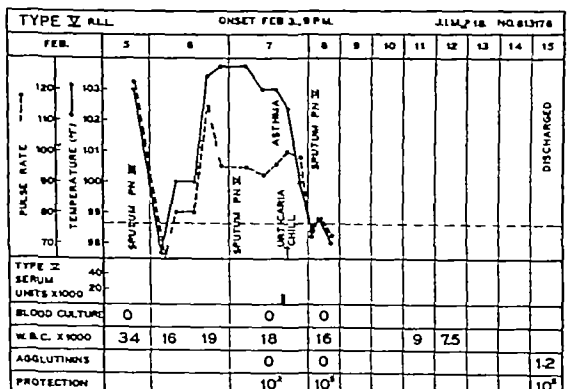
CASE 2



CASE 5



CASE 3



CASE 6

## EXPLANATION OF THE CHARTS

All of the patients had lobar pneumonia. The extent of involvement at the time treatment was begun is noted in the upper left corner: RLL = right lower lobe, RUL = right upper lobe, LLL = left lower lobe and so forth.

The age of the patient is given in the upper right hand corner between the initials and sex designation and the hospital number.

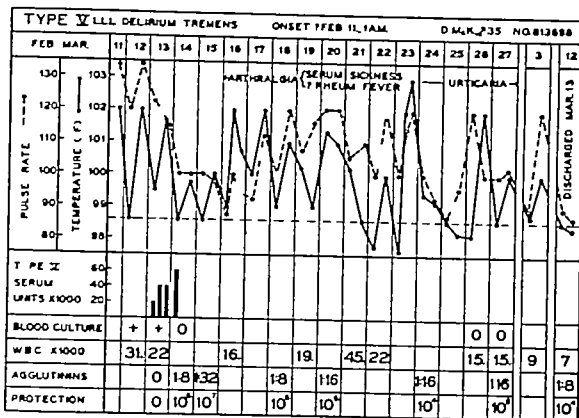
Type V pneumococci were obtained from the sputum usually on more than one occasion in every case of Type V pneumonia. These results are not shown in the charts unless especially indicated.

Blood cultures 0 = sterile + = positive for Type V pneumococci

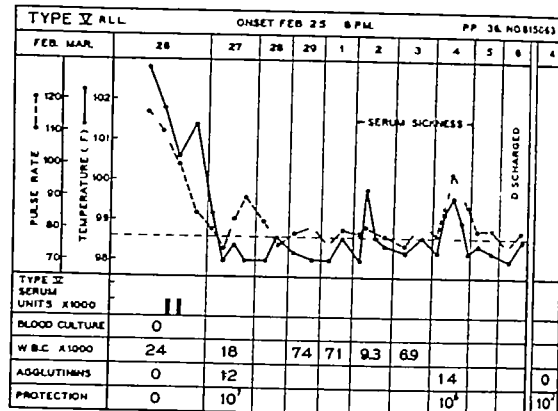
Agglutinins 1 2 1, and so forth = the highest dilution of serum in which floccular agglutination of Type V pneumococci was observed + or ± = moderate or slight clumping of Type V pneumococci seen microscopically in a serum in which macroscopic agglutinins could not be demonstrated.

Protection 0 10<sup>1</sup> 10<sup>2</sup> and so forth = the largest number of fatal doses of pneumococci against which mice were protected by 0.2 cc. of serum

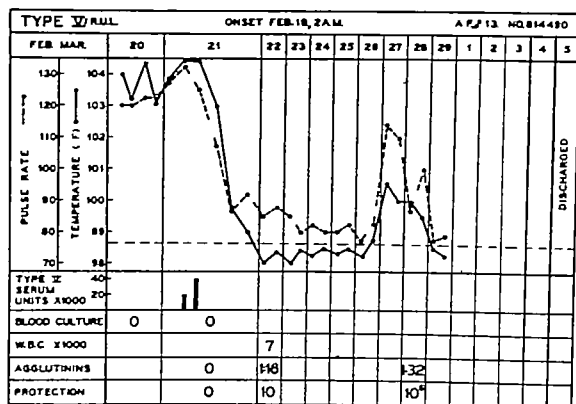
P = pneumococcus the type is designated by Roman numerals



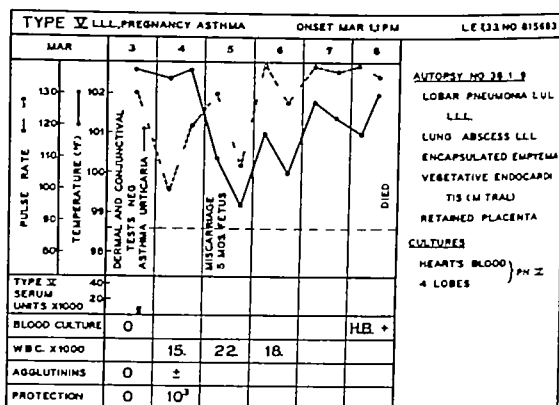
CASE 7



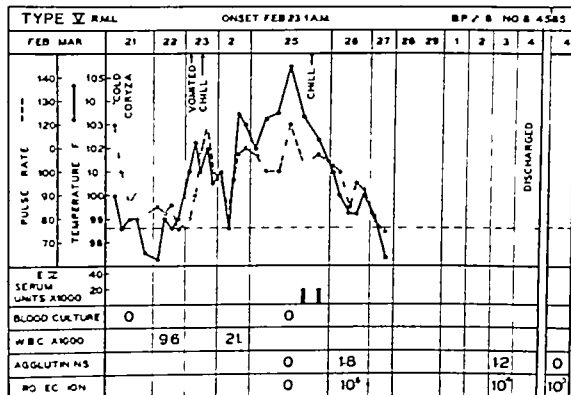
CASE 10



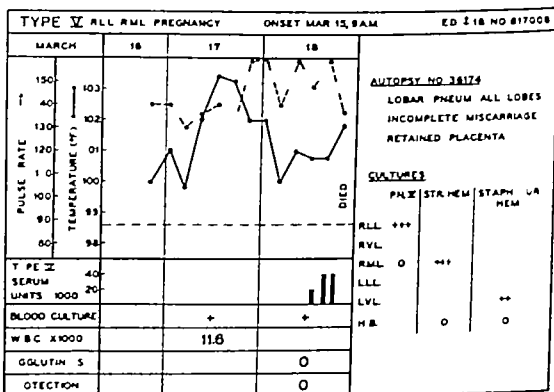
CASE 8



CASE 11

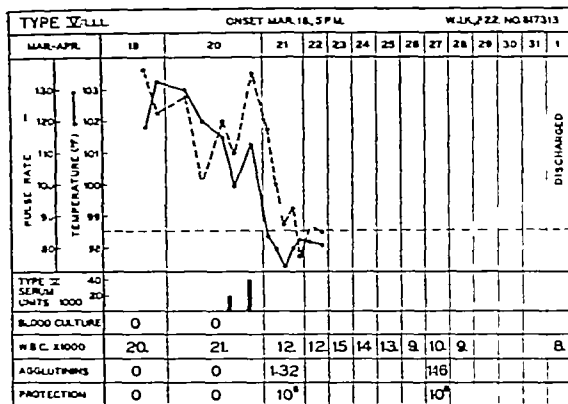


CASE 9

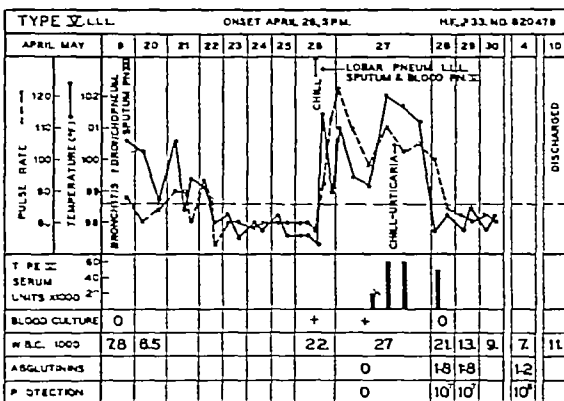


CASE 12

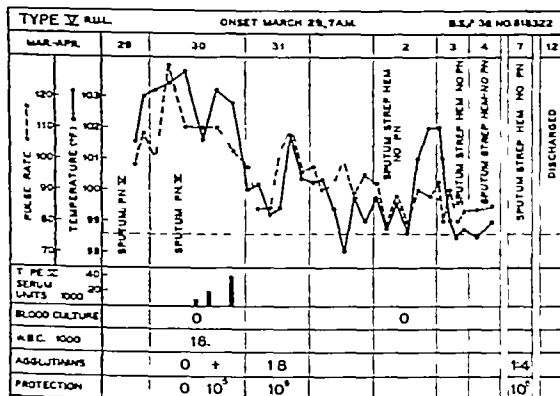




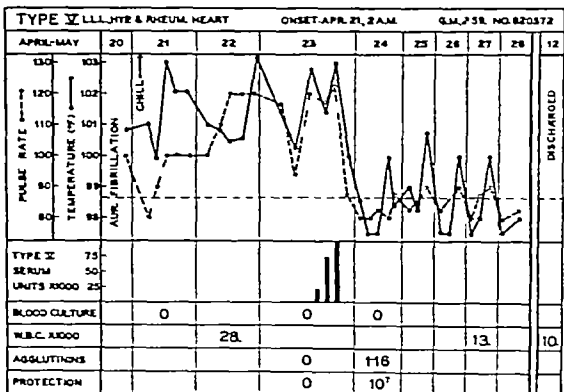
CASE 3



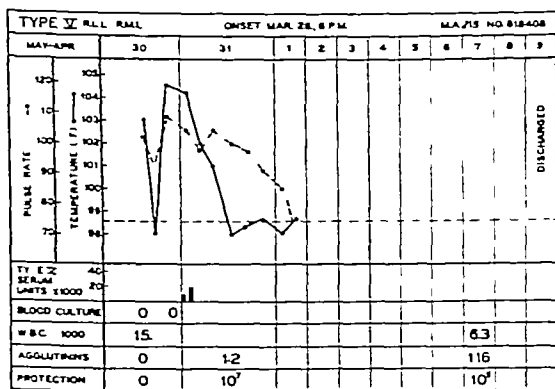
CASE 16



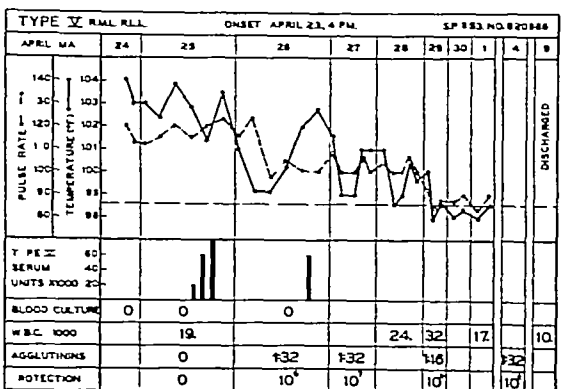
CASE 14



CASE 17



CASE 15



CASE 18

still had fever and symptoms on the eighth day of the disease

**Bacteremia** Positive blood cultures were obtained before the first injection of serum in 9 cases. In 6 of these cases, all subsequent blood cultures were sterile. One patient case 20, required a second course of antibody injections before the blood culture became sterile. In case 4 and in case 12 the blood invasion persisted after treatment. Bacteremia was first demonstrated after treatment with a small dose of antibody in case 11. The latter 3 cases will be referred to presently.

**Complications** Purulent pneumococcal complications occurred after serum therapy in 5 patients, 4 of whom had positive blood cultures before this treatment was begun. In case 11, an encapsulated empyema and vegetative endocarditis were first found at autopsy. The other 4 patients recovered after operative interference, 2 for empyema (cases 20 and 25), 1 for pelvic abscess (case 26) and 1 for bilateral otitis media (case 22). In case 22, sterile blood cultures were obtained repeatedly. Type V pneumococci were recovered from the purulent exudate in each of these 5 cases. Among the 67 patients treated without serum during 1935-36, 8 had empyema and 6 of these died. In 3 of these fatal cases, other purulent complications were found—pericarditis in 1, peritonitis in a second and meningitis and vegetative endocarditis in the third.

**Extensions of the Pulmonary Lesion** These occurred after serum treatment only in case 11. Among the contemporaneous nonserum treated cases, on the other hand, extensions of the pulmonary lesion were shown to occur after admission to the hospital in 13 patients, of whom 5 died.

**Fatal Cases** The 4 deaths among the serum treated cases are of especial interest. In case 4, there was severe diabetes mellitus, in which the glycosuria could not be controlled and acidosis developed and progressed in spite of vigorous treatment. Bacteremia, in this case, was not affected but actually increased from 3 to 160 colonies per cubic centimeter of blood, in spite of three daily doses of 100,000 units of antibody. In case 11, the pneumonia occurred as a complication of a septic abortion in a patient with asthma and rheumatic heart disease. Serum was discontinued after only 10,000 units had been injected because of a severe reaction with asthma. The pulmonary lesion extended rapidly thereafter, and bacteremia developed before death. In case 12, an incomplete miscarriage occurred at the end of the third day of the pneumonia. Serum treatment was begun 12 hours later when the patient was in *extremis*. Death occurred within 7 hours after the first injection

of serum. The fourth patient, case 19, was a 72 year old colored woman with a positive blood culture when serum treatment was begun. A dose of 68,000 units was given. The patient developed pulmonary edema a few hours later, and, on that account, no further serum was injected when the results of the blood culture were ascertained. A subsequent blood culture was sterile.

**Death Rates** The mortality rates in cases treated with serum and in nonserum treated cases are shown in table 1. It is evident from

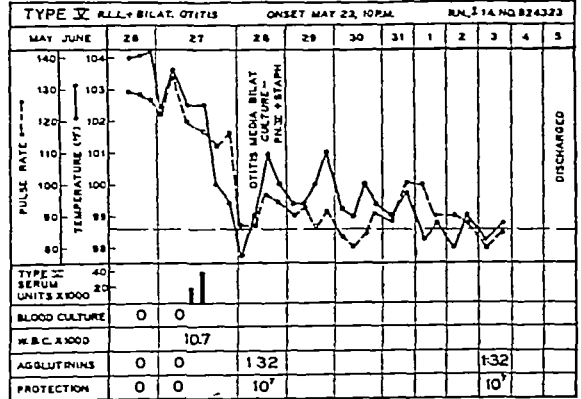
TABLE 1  
DEATH RATES IN PNEUMOCOCCUS TYPE V PNEUMONIA

	1929-35			1935-36			1935-36		
	No Serum			No Serum			Serum Treated		
	Number of Cases	Number Died	Per Cent Died	Number of Cases	Number Died	Per Cent Died	Number of Cases	Number Died	Per Cent Died
All Cases	130	64	49	67	26	40	26	4	15
12-29 years	32	8	25	19	2	11	13	1	8
30-49 years	55	25	45	28	8	29	10	2	20
50+ years	43	31	72	20	16	80	3	1	33
Positive Blood Culture	39	34	87	28	21	75	9	3	33
Sterile Blood Culture	61	17	28	36	4	11	17	1	6

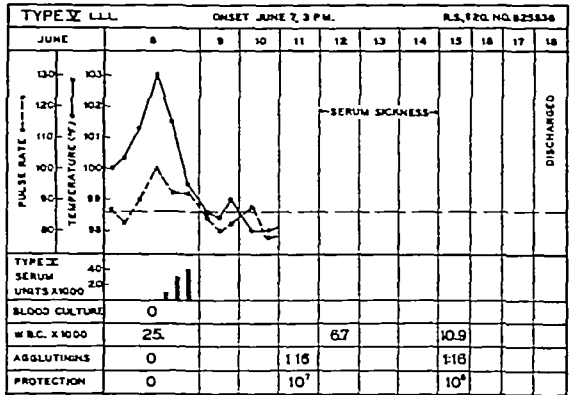
the consideration of the fatalities among the serum treated cases and from the experience with other types<sup>18</sup> that mortality figures alone cannot be used as an adequate criterion for the efficacy of any specific treatment. The figures presented, however, are of some interest. The fatalities that occurred before June, 1935, have been analyzed elsewhere.<sup>10</sup> Among the 26 more recent deaths, 6 occurred in patients in whom the pneumonia was secondary to other serious illness. Two began in the course of congestive cardiac failure, 2 complicated the puerperium, 1 followed injuries including a fractured skull and 1 occurred in a patient with carcinoma of the prostate. Four of the 26 deaths, including 3 with secondary pneumonia, occurred within 24 hours after admission to the hospital.

**Untoward Reactions** Such were encountered and were similar to those observed following concentrated antibody injections in the treatment of pneumococcus Type I and Type II pneumonia.

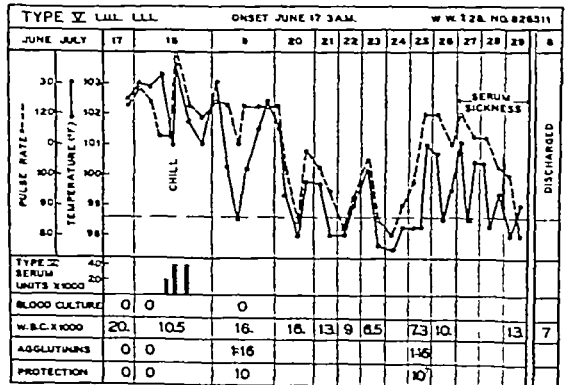
**Immediate (allergic type) reactions** were observed in 3 patients. In case 6, throbbing sen-



## CASE 22



CASE 23



CASE 24

sation in the head flushing of the face, asthmatic wheezing violent cough urticaria, vomiting and chill occurred during and immediately after the first injection of antibody which was interrupted after only 6 000 units had been introduced. There was a history of vaccine injections for 'bolls' and toxin-antitoxin injections for immunization against diphtheria but the tests for sensitivity to horse serum were considered negative. This patient was afebrile within 10 hours and no further treatment seemed necessary. In case 11 there was a history of asthma, a negative conjunctival test and only a slight reaction of erythema to the cutaneous test. A severe asthmatic attack began as soon as 10 000 units had been introduced and was controlled only with difficulty. No further antibody was given to this patient. Her pulmonary lesion extended, bacteremia developed, and she died. In case 25 generalized urticaria appeared during the first and third injections of 10 000 and 20 000 units, respectively and was easily relieved by small subcutaneous doses of adrenalin. A single chill 30 to 90 minutes after injection was experienced by 6 patients (cases 4, 5, 9, 16, 20 and 24). In five instances this followed the second injection, consisting of 50 000 to 70 000 units and in the sixth case it followed an initial injection of 20 000 units. The chills were all mild, lasted only a few minutes and were not accompanied by a rise in temperature of more than 2°F in any instance. Serum sickness occurred in 8 patients (cases 1, 2, 7, 10, 23, 24, 25 and 26) and was characterized in all but one instance by mild arthralgia and slight fever of short duration. In case 7, the arthralgia began early, recurred was moderately severe and was accompanied by urticaria in the latter part of its course.

*Specificity of the Clinical Response.* Four patients with Type V pneumococcus pneumonia have been treated with large doses of Type II antibody. Two of these patients died and the other 2 recovered by crisis 3 and 5 days respectively, after treatment. No beneficial effect on the course of the disease was observed in any of these patients. The course of the illness in 1 of these patients is represented graphically (case 27). The charts of 3 patients that had pneumonia of other types but received Type V antibody are also shown (cases 28, 29 and 30). No benefit resulted and antibodies for the patients' types did not appear in the serum after treatment.

#### IMMUNOLOGIC RESULTS

*Mouse protective antibodies* for Type V pneumococci could not be demonstrated before treatment was begun except in case 6 in which they were present in low titer. These antibodies were demonstrated, however, in every serum obtained after treatment with specific antibodies, even in patients who subsequently died. In 2 patients (cases 4 and 20) these antibodies were present in the same blood from which pneumococci were cultured, but the titers were lower than those found in other serums.

*Type-specific agglutinins* could not be demonstrated in any of the patients before antibody therapy was begun. In 4 patients (cases 4, 6, 11 and 20), one or more serums obtained after treatment failed to show Type V agglutinins,

although they protected mice against 1000 to 100,000 fatal doses of pneumococci of the same type. In case 12, there was no opportunity to study the patient's serum after treatment. Good agglutination in smears of mixtures examined microscopically was constantly noted with sera in which floccular agglutinins were demonstrated, even though the titer was low. In occasional serums (cases 11 and 14) slight to moderate clumping was observed microscopically in serums in which no macroscopic agglutinins were demonstrated, but in which low titers of protective antibody were present.

These findings indicate that a balance of Type V antibody can be established and maintained very readily in the blood of patients with Type V pneumococcus pneumonia by the intravenous injection of moderate doses of homologous concentrated antibody early in the course of the disease. In certain patients with bacteremia, however, fairly large doses may be necessary to accomplish this result.

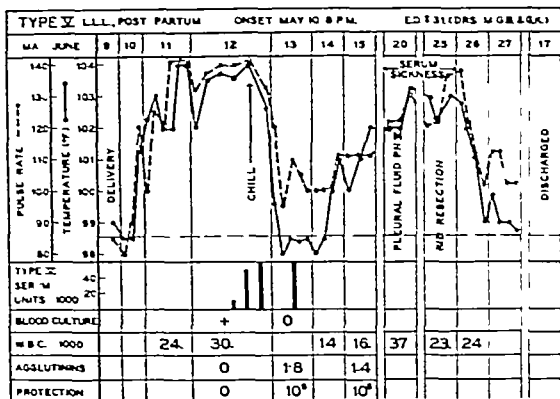
#### DISCUSSION

Experience with pneumonia due to the Type I pneumococcus<sup>17, 18</sup> has shown that the clinical response to treatment in a succession of individual cases may be a most valuable guide in the evaluation of specific antibody therapy. When a sufficient number of cases are treated with different amounts of antibody, this response may serve to determine the effective dose. Many factors have been found to influence this response, the most important of which are the presence or absence of bacteremia and the duration of illness at the time treatment is begun. Other factors such as the extent of the pulmonary lesion, beginning purulent complications and other conditions, such as pregnancy and certain preexisting diseases, may also play an important role.

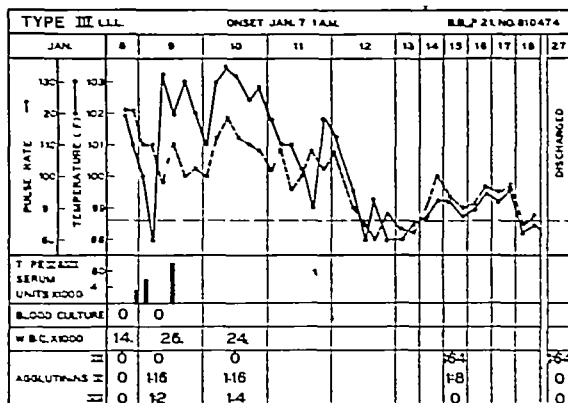
The uniformity with which a condition simulating a spontaneous crisis followed the use of specific antibody in the cases of Type V pneumococcus pneumonia here presented and the fact that the few apparent failures could be reasonably explained suggest that we were dealing with an effective therapeutic agent. Some evidence was also adduced which indicates that the action of this agent is strictly type specific.

The regularity and expediency with which a balance of antibody, similar to and even greater than that encountered after spontaneous recovery from pneumonia due to this type, was established and maintained in the blood of patients treated with serum early in the disease are further evidences for the efficacy of this agent.

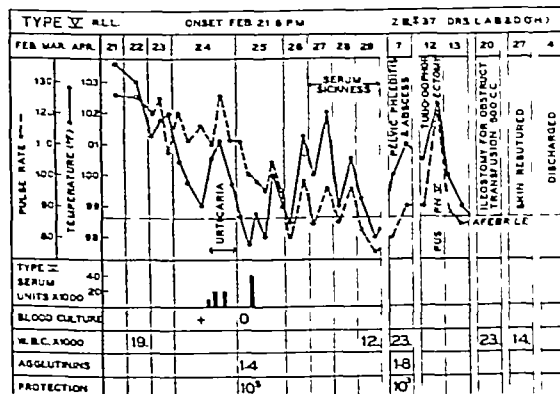
The clinical response has been dwelt upon here because the death rates noted in table 1 though they suggest definite benefit cannot be given too great weight. The number of treated



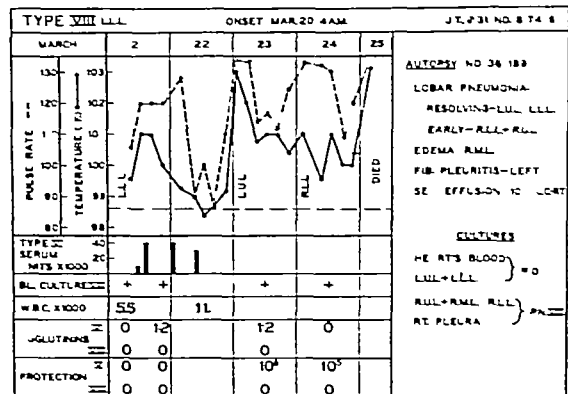
CASE 26



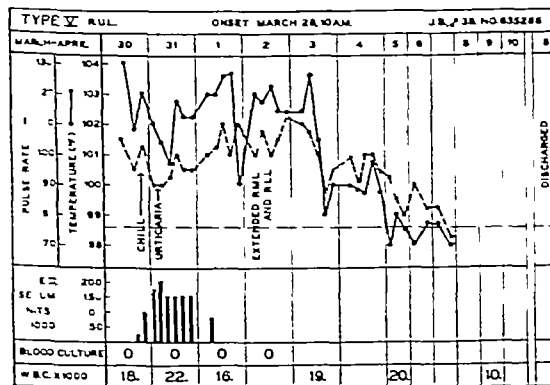
CASE 26



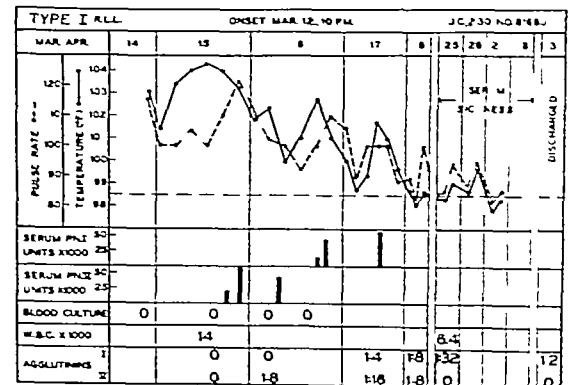
CASE 27



CASE 28



CASE 29



CASE 30

cases is too small to be significant in this respect, and the age distribution of the cases is seemingly favorable. Bullowa and Wilcox<sup>19</sup> have recently reported their more extensive experience with therapeutic serum for this type. They have used much larger doses and have demonstrated a definite and marked reduction in mortality among specifically treated cases as compared with nonserum treated cases.

No definite conclusions can be drawn with regard to dosage from the limited number of cases available. Certain considerations may be helpful in making a tentative plan of dosage. The increasing mortality of pneumonia in advancing age groups is well known. This has been shown to be closely related to a parallel increase in the incidence of bacteremia with age, except in extreme old age.<sup>10, 18, 20</sup> There is also evidence suggesting that a given amount of antibody may be more effective when given within a few hours than when its administration is spread over more than 24 hours. This is particularly important in bacteremic cases.<sup>18, 21</sup> While it would be desirable, in general, to introduce a huge excess of antibody as soon as possible, a consideration of the limited supply available and of the high cost of producing a potent antibody that gives a minimum of untoward reactions warrants limitation of dosage to amounts not too far in excess of those that may be expected to prove efficacious.

A reasonable, tentative plan of dosage based on these considerations and the experience in the cases presented, would be an initial dose of 60,000 units in patients under 30 years of age and of 100,000 units in those over 30 and in patients during pregnancy or the puerperium. An additional 60,000 to 100,000 units should be given as soon as it is learned that the blood culture taken before the first injection is positive for Type V pneumococci. The smaller additional doses may be reserved for those that have already shown marked improvement from the previous dose or that show good agglutination of Type V pneumococci in their serums. Additional doses of 40,000 to 100,000 units may be given at 8 to 12 hour intervals for 48 hours, if there is no evidence of marked clinical improvement, unless the persistence of symptoms can be explained on any basis other than Type V pneumococcus pneumonia, such as empyema or mixed infection.

The agglutination test may be useful as a guide before giving additional doses, particularly where fever persists after the other symptoms are definitely improved. If the microscopic test is used, the agglutination must be marked. When bivalent serum is used, it is best to use as controls pneumococci of two other types, one of which corresponds to the other type of antibody contained in the therapeutic serum.

In actual practice the amount of antibody

that can be given conveniently with each injection will vary with different lots and will depend on their concentration and capacity to produce chills. In the present cases, 5 patients received 10,000 units and the rest 20,000 or 25,000 units as an initial dose. Excepting the 2 patients that had immediate asthmatic reactions, which were probably associated with specific hypersensitiveness, only 1 patient experienced a chill from the initial dose and this contained 20,000 units. The only other chills encountered followed the second dose and occurred in patients receiving 50,000 units or more at that injection. For these lots, therefore, an initial dose of 20,000 units or less and succeeding doses of 40,000 units at intervals of 2 hours would seem satisfactory. The interval of 2 hours has been chosen because during this interval any chills that may result will have occurred and the succeeding dose may be adjusted accordingly.

#### SUMMARY AND CONCLUSIONS

The results of early treatment with specific antibody in 26 cases of pneumococcus Type V pneumonia have been presented.

Changes similar to those occurring during spontaneous crisis promptly followed this treatment with fair regularity.

The few poor clinical results occurred in patients that received inadequate doses or that had other serious complicating factors.

The results of tests for homologous type specific agglutinins and mouse protective antibodies in the serum of these patients showed that a balance of specific antibodies was readily established and maintained in early cases adequately treated.

Some evidence was adduced in support of the strictly type-specific character of the response observed.

The problem of dosage was discussed.

The findings suggest that specific antibody is a useful agent in the treatment of pneumococcus Type V pneumonia, when used in adequate amounts early in the disease.

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## ANEURYSM OF AN INTESTINAL BRANCH OF THE SUPERIOR MESENTERIC ARTERY

BY ARTHUR R KIMPTON, M.D.,\* AND SIDNEY C DALRYMPLE, M.D.\*

THE following case is briefly reported as a unique example of an aneurysm of a submucous intestinal artery. No similar case has been found in the literature.

CASE A 37 year old housewife past and family history irrelevant entered the hospital complaining that on the day of entrance she had a sharp sudden pain in her lower left abdomen which was followed by a loose, tarry movement. Following this movement she fainted. Three weeks prior to the day of entrance she had had severe epigastric pain with nausea and vomiting. This attack of pain was ended by a loose, tarry movement. Upon entrance the physical examination was negative except for a loud blowing systolic murmur moderate epigastric tenderness and extreme pallor. Her laboratory examinations show occult blood in her stools an anemia of 1 760 000 red blood cells and hemoglobin of 14 per cent (Sahli).

The patient improved following transfusions. At the end of 3 weeks her stools were negative for occult blood and her blood picture was 3 020 000 red blood cells and 45 per cent hemoglobin.

At this time x ray studies of her esophagus stomach duodenum and colon were negative. However she was discharged from the hospital with the tentative diagnosis of peptic ulcer and advised to come to the Out Patient Department for observation.

During the next year her condition remained satisfactory except for occasional nausea unrelated to meals. Her blood picture remained just below 4 000 000 red blood cells and 70 per cent hemoglobin. At the end of this period she again had lower abdominal pain usually relieved after passing a soft, black stool.

She entered the hospital again 16 months after the first admission because of pain and weakness. Physical examination was essentially negative the same as on her previous admission. Her red blood cell count was 2 961 000 and hemoglobin 34 per cent. Bleeding time and coagulation time were normal. Occult blood in her stools was strongly positive at this time.

After five transfusions her general condition was improved. Her blood picture however showed but slight improvement. Her stools continued to show blood. A Hinton test on her blood serum was negative.

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X ray studies of esophagus stomach duodenum and colon were again negative. The heart and great vessels were normal in size and shape. The mediastinum was not increased in width. The lung fields were clear.



FIG 1 The vessel at the periphery of the nodule which increased rapidly in size until reaching the dimensions shown in fig. 2.

An exploratory laparotomy was performed 6 weeks after admission, the preoperative diagnosis being hemorrhage from an adenoma of the small intestine. A very rigid exploration of the entire stomach small and large bowel at first revealed nothing.



FIG 2 The aneurysm of the vessel shown in fig 1 showing the cannulation with fresh thrombus formation and early organization  
The point of rupture through the mucosa is shown with the point of bleeding

On the third examination of the small intestine a small nodule about three-eighths of an inch in diameter, quite solid and hard was found in the wall of the small intestine, 12 inches below the ligament of Treitz. Upon opening the intestine at this point a small point in the mucus surface over this nodule was found dropping blood. The nodule was excised and the intestinal wall closed. Following the operation the patient's condition rapidly improved. The stools failed to show any occult blood, and the blood picture rose to 4,750,000 red blood cells and 80 per cent hemoglobin 5 weeks after the operation. Three months after the operation the red blood count was 4,900,000 and the hemoglobin 94 per cent.

The pathologic examination of the surgical specimen showed a rounded mass 8 mm in diameter, partially covered with soft, velvety pinkish, mucous membrane in the center of which was a slightly raised point 1 mm in diameter and reddish in color. On section the mass appeared to consist of firm greyish tissue through which passed a few reddish streaks.

Microscopic examination showed an aneurysmal dilatation of a small artery the wall of which was markedly thickened partially filled with clot, the periphery of which showed early organization. Several canalized channels led out to the mucus surface through which hemorrhage into the lumen of the intestine was noted. A search at the periphery of the nodule showed the entering vessel partially thrombosed. The diameter of the undilated portion of the vessel was approximately 0.4 mm while the dilated portion measured 4 mm.

From a study of this case it is suggested that in operative cases of gastrointestinal hemorrhage without demonstrable ulcerative lesions a careful examination of the entire length of the small intestine be made.

## LYMPHATIC METASTASIS IN A CASE OF RECTAL ADENOCARCINOMA SIMULATING A CLINICALLY BENIGN TUMOR

BY WILLIAM M. SHEDDEN, M.D.<sup>\*</sup>

**C**ARCINOMA of the rectum usually metastasizes very slowly and most of the growths with glandular involvement are excavating ulcers showing a tendency to invade the muscularis. In fact, many pathologists state that metastasis does not occur unless the muscularis is invaded. The glands usually involved are those nearest the point of direct extension and there is apparently no relation between the size of the growth and the extent of regional involvement of the lymph nodes. It has been observed by many that local extension renders a lesion inoperable more often than does metastasis. It is a curious fact that whereas metastases are commonly met with in the tissues outside the rectum they are never seen in the wall of the rectum. Miles suggests that the lymphatics of the mucosa therefore probably do not exist as

a continuous plexus, but are arranged as decussating arborescents from which collecting stems pass straight through the circular coat to join the intermuscular plexus. Spread, in the latter, is just as limited and so it may be concluded from histologic as well as from clinical findings, that the intramural spread of cancer of the rectum is always of comparatively trivial extent. Occasionally the retrorectal glands are obviously enlarged and can be readily felt, but, in the majority of cases, though the fresh specimen is carefully palpated, it is extremely difficult to be certain whether the glands are enlarged or not.

The papilliferous carcinoma is not particularly malignant and seldom gives rise to extramural metastases unless it has been present for a considerable time. A small, soft superficial productive tumor involving only mucosa and submucosa is usually considered benign, and a local excision with a good margin of healthy

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tissue may usually be performed. But a small soft tumor is not always benign and we cannot always be complacent about a tumor of this nature as is shown by the following case history.

J. J. M. (Phillips House No. 24291) entered October 23, 1934, with the story of a slight staining of blood at stool on five occasions during the preceding 2 years and twice during the past 3 months. He had observed slight constipation and flatulence for 2 months but had never noticed rectal pain, tenesmus, mucus or weight loss. His past history was irrelevant to the present problem. Physical examination revealed vascular hypertension (180/115) and digital rectal examination demonstrated a polypoid tumor 2 to 3 centimeters long about the same width and at a distance of about 7 centimeters from the anus on the posterior wall. It was not ulcerated, was soft throughout including the base, and apparently was very superficial. Two proctologists had expressed the opinion that this was unquestionably a benign growth and we concurred in this. Biopsy was not done for it has been our experience that with small rectal growths it is far safer to submit the entire tumor to the pathologist. Four days after entrance the mass was excised by bipolar electro-

tremely dangerous was demonstrated by histologic examination of the glands draining that organ. A variation of the above case history is one reported by Lockhart-Mummery<sup>3</sup> who excised a soft tumor from the rectum which, on

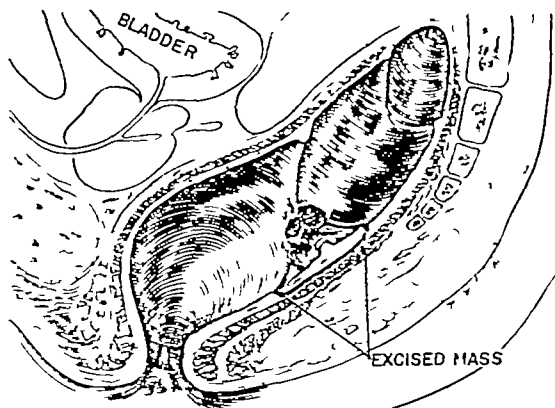


FIG. 1

desiccation including a margin of about 1½ centimeters of healthy tissue. The operation seemed to confirm the preoperative diagnosis of a benign tumor for it obviously did not penetrate below the submucosa. We assumed that barring the presence of other polyps the patient's rectal troubles were at an end.

But the pathologic report (No. 34-4316) read as follows: A soft mass of granular tissue measuring 2 by 1 by 1 centimeters. Diagnosis: Adenocarcinoma—Grade II (H. F. Hartwell).

November 13, 1934, a one-stage abdominoperineal resection was performed according to the technique of Miles. The pathologic report is unusual. At a distance of 7 centimeters from the anus there is a transverse line 2 by 2 centimeters and of purplish red color. On section there is found beneath this line a narrow zone of bluish discoloration. No trace of primary tumor can be found but there are two small pararectal nodes containing metastases.

The patient's convalescence was complicated by pyelitis, but otherwise uneventful. When seen, 24 months later, there was no evidence of recurrence. Here then we had a very superficial tumor completely excised from the rectum. That this tumor was nevertheless ex-

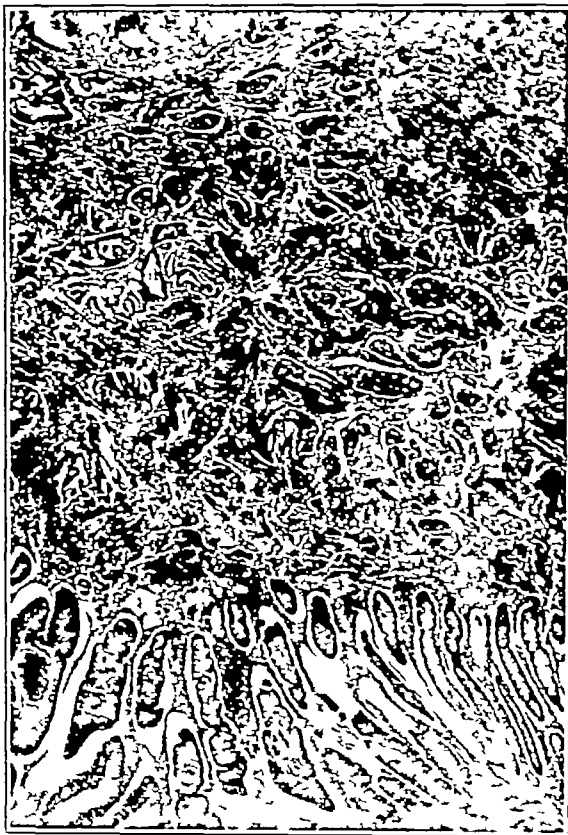


FIG. 1A Section from excised tumor clinically benign—actually malignant

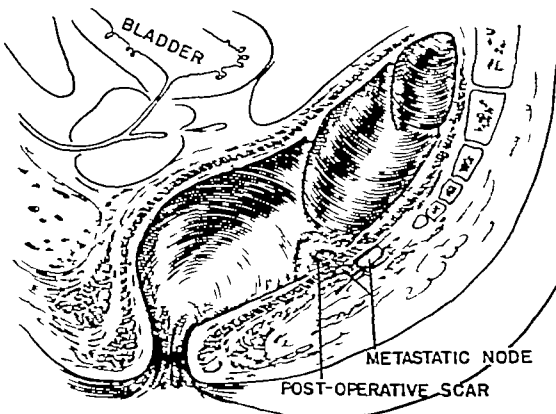


FIG. 2

histologic examination was found after several sections had been cut, to be a benign adenoma. When seen 15 months later, the patient had a malignant adenoma in the situation of the previous benign tumor.

Rankin,<sup>8</sup> in a series of cases of cancer of the colon and rectum, found that the incidence of glandular involvement was in direct ratio to the grade of malignancy. Most of the growths in his series were of Grade II and of these 35 per cent had metastases in the glands. Pennington collected data on 997 necropsies of patients dying from cancer of the rectum and in 32 per cent the regional nodes were found to be involved.

C. E. Dukes, in a study of 208 carcinomata of the rectum graded histologically by the tech-



FIG 2A Rectum shows no tumor Granulation tissue in area of previous tumor

nic of Bionders, found 125 to be of Grade II. Thirty-six per cent of these had lymphatic involvement. In this group there appeared to be a definite relation between the degree of differentiation of the malignant cells and the extent of spread into the lymphatic drainage.

Oehler<sup>7</sup> reports that 38 per cent of fifty-four patients who died from carcinoma of the rectum and on whom necropsies were performed had glandular involvement in the retroperitoneal lymph nodes.

McVay<sup>4</sup> found metastases in lymph nodes in 47 per cent of one hundred consecutive resected specimens of rectal carcinoma. The high incidence of glandular involvement in McVay's series is probably due to the fact that in his series alone were all the glands systematically examined. Involvement of perirectal nodes does not in itself indicate inoperability, as evi-

denced by its common occurrence in resected specimens. Early glandular involvement affects so small a part of the gland that it can only be ascertained by microscopic examination. The lymph sinuses at the edge of the gland are first affected.

Miles maintains that the spread of rectal carcinoma takes place earlier and with greater rapidity via the lymphatics than by direct extension. This, of course, is an argument in favor of the radical abdominoperineal operation. His description of the spread of carcinoma of the rectum is now a classic. He emphasizes the fact that there are three lymphatic systems, the *first intramural*, is subdivided into two distinct, freely communicating networks, one in the submucosa and one between the muscular layers, continuous above with the networks of the pelvic colon and below with those of the perianal region and with the inguinal nodes. The intermuscular portion connects with the *second* portion of these lymphatic systems, namely, the *subserous*, lying between the external muscular coat and the perirectal fat. In this second portion of the lymphatic system, a detached cancer cell may wander before entering the *extramural* or *third* portion of the system.

Extramural spread may take place downward, laterally or upward. The downward channel accompanies the inferior hemorrhoidal vessels, and the tissues traversed are those of the ischioanal fossa, the external sphincter muscles, and the perianal skin. From here the channels empty into the internal iliac nodes. In the lateral extension of the disease, the levator ani muscles and pelvic fascia, coccygeus muscle, pelvic peritoneum, prostate gland or uterine cervix, base of broad ligament, and base of urinary bladder are traversed. Efferent vessels from here reach the uterine iliac group. The paths of the upward main channels of spread accompany the superior hemorrhoidal veins, and traverse the lower mesocolic and retrorectal nodes, the pelvic mesocolon and from thence the nodes that lie at the bifurcation of the left common iliac artery and along the aorta. Miles<sup>5</sup> also emphasized that progress of the carcinomatous cells may be arrested and produce nodules at any point. In estimating the extent of the spread, it is important to know that whenever metastatic growths are visible, distant invisible metastatic growths are likely to be present. Clinical experience in general agrees with this view, and with the method of spread of rectal carcinoma that it suggests. Miles believes it probable that rectal cancer cells become detached from the primary growth almost synchronously with its inception, and finding their way by means of the lymph channels into the surrounding tissues, form more or less distant metastases. It is also probable that detached

cancer cells pass through the bowel wall somewhat rapidly by means of the intramural lymphatic system, and gain access to the external lymphatics giving rise to extramural metastases scattered over a fairly wide area, long before the muscular coat has been penetrated by direct extension of the growth. It is not uncommon to find an involved gland several inches above the rectal growth as the sole evidence of spread along the mesenteric border of the pelvic colon

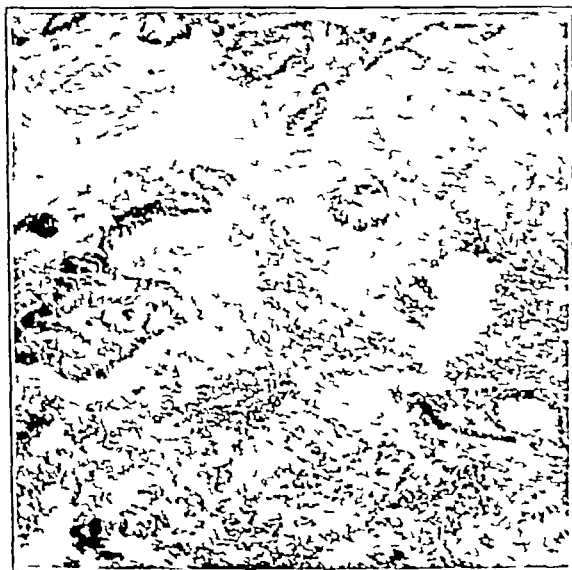


FIG. 2B. Lymph node behind area designated in 1A. Metastatic carcinoma.

It is agreed by most workers in this field that carcinoma of the rectum develops from the crypts of the glands of Lieberkühn which, when they take on their migratory activities, break through the tunica propria of the mucosa into the submucosa, invade the circular muscular coat and, on reaching the intermuscular lymphatic network, tend to progress around the bowel in the direction of these vessels. This accounts for the encircling tendency of rectal carcinoma. From here the cells invade the longitudinal muscle layer and, on reaching the outer muscle wall, their extension is restricted by the rectal fascia. *The invasion of the lymph nodes through*

*the lymphatics may occur at any time after the disease reaches the submucosa*, but such invasion is usually late. Handley has described a marked dissemination in the submucosa occurring early. This he claimed to have demonstrated by mucicarmine staining of entire sections of the bowel. Cole,<sup>2</sup> Monsarrat and Williams,<sup>6</sup> and Cheate<sup>1</sup> were unable to confirm his findings.

The size of the rectal growth cannot be relied on as an accurate index of the probable lymphatic involvement. Growths without lymphatic involvement tend to grow into the lumen of the bowel. The growths with slight lymphatic involvement tend to spread by direct extension and are slow-growing. Metastatic lymph node involvement can only be definitely determined by systematic microscopic study of all the regional nodes.

#### SUMMARY AND CONCLUSIONS

We have presented a case history of cancer of the rectum with unusual findings. To depend on the criteria of size, soft consistency and mobility in estimating the malignancy of a rectal tumor is not safe. A "benign polyp" may not only be cancer of a fairly advanced grade but may have actually metastasized when first seen. The above case history serves to emphasize the point made by Miles<sup>5</sup> and others that if a diagnosis of adenocarcinoma of the rectum is confirmed and if the patient's condition warrants it, nothing less than an excision, having as its upper limit a wide margin of intestine above the growth and including the glands of the mesosigmoid, is justified.

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#### A WOMEN'S FIELD ARMY

Under the above designation a movement is under way to start a membership drive to enroll at least 50,000 women soldiers in the New York division of the national organization to fight cancer. One of the main purposes of the army is to have organizations in the states throughout the country in order to establish the importance of state activities in the effort to control cancer. Miss Harriet W. Mayer is State Commander of the New York division of the army.

In an address before a conference of the Women's Field Army Dr. Frank E. Adair, Secretary to the American Society for the Control of Cancer, gave

an address which placed the facts relating to the incidence of cancer among women showing that one of every eight women reaching the age of forty years may be expected to die of cancer under existing conditions.

As offsetting these unpleasant facts he felt hopeful of great progress in the saving of life through education explaining that under present conditions 25 per cent of women with cancer did the correct thing as ordered by doctors. Another 25 per cent do not follow doctors' advice. Twenty-five per cent never go to the doctor until it is too late and about 25 per cent are advised wrongly by doctors. These figures show the great importance of an educational campaign by women.

## NEW HAMPSHIRE MEDICAL SOCIETY

MORE RATIONAL METHODS IN THE PREVENTION AND  
CONTROL OF ECLAMPSIA\*

BY J O ARNOLD, M D †

*Mr President, Ladies and Gentlemen*

LET me say to you that I keenly appreciate the opportunity and the privilege of speaking on the subject of puerperal eclampsia. I am keenly appreciative of the responsibility that it involves. Anybody who undertakes to say anything on this disputed question of the etiology and treatment of eclampsia, that is at all different from what is usually accepted, takes double responsibility. If he has something *good*, he has a real responsibility in trying to make it clear so that others may understand it. If it isn't anything worthwhile, his responsibility is to get out of the way of the other speakers as quickly as possible.

There are certain applications of general and well-known principles of fluid balance and dehydration upon which we have been working in this field of eclampsia, for a little over six years, and I will pass very rapidly over some of these that, I think, are essential to the understanding of what I shall have to say.

I am speaking as a clinical obstetrician, leaving to the research men of the profession the discovery and discussion of ultimate causes and factors that lie back of the principles that are involved in these newer methods of treatment. We feel perfectly justified in presenting to you these methods as effective measures for controlling the *results* of those ultimate factors or causes, even though we may not yet know all about what those causes are.

For years, it has been assumed by obstetric writers that there could be no rational treatment for eclampsia until the *cause* is known. But we are taking the privilege seriously to question or *deny* this assumption and to say that we have at least a rational method of controlling the *results* of those causes, and that we believe this to be a forward step of real practical value.

I shall show some charts that I use in my classroom work and present some of the factors vitally involved in the discussion to follow.

The first chart shows the course of normal pregnancy, C-D, with the normal water retention or storage of water in this shaded part, and the normal decrease in output of urine during pregnancy shown in line A. Let us assume that

the dotted line B represents the unknown endocrine control factor which is possibly (and we believe, probably), the posterior pituitary body.

Here we have represented the three factors chiefly involved in the very informal talk I shall present on this subject. This first chart

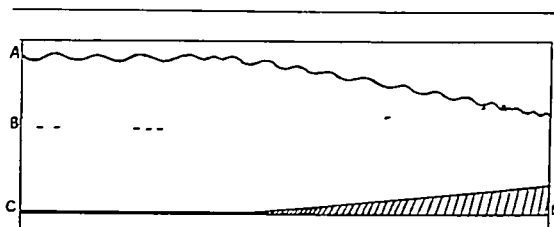


CHART 1

- A Line of Normal Decrease of Urine Output
- B Line of Normal Pituitary Increase—Hyperfunction
- C Line of Normal Weight Gain—Water Retention.
- C D Course of Pregnancy

represents the normal, as I have suggested, and I am sure that everything here can be easily verified, and has been many times by ourselves and others, in other words, there is normally a diminution of output of urine as pregnancy advances to term. There is also—at least it has been demonstrated to the satisfaction of ourselves, if not to everybody else—a hyperfunctioning of the pituitary body, as pregnancy advances, as indicated in line B.

As long as these normal conditions are maintained, the so called toxemia of pregnancy will

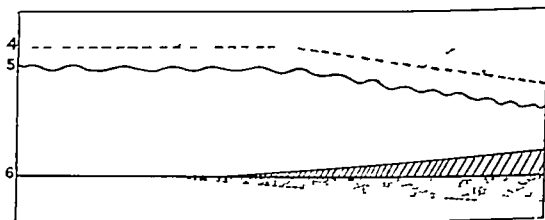


CHART 2

- 1 Line of Fluid Intake—Abnormal Increase—Pushing Fluids
- 2 Line of Normal Decrease of Urine Output
- 3 Effect on Weight Gain—Edema—Potential Danger

not arise. But, certain things may happen. Certain changes may influence these relations. For instance, the moment we begin to see any considerable diminution in the output of urine, we have been in the habit, many of us, of increasing the intake, with the purpose of bringing up the output, unfortunately, in many instances, this has had the opposite effect. It has resulted in this added shaded line here (chart 2, line 6) which represents the additional storage of water.

\* A stenographic report of an address delivered at the Annual Meeting of the New Hampshire Medical Society at Manchester May 27 1935.

† Arnold J O—Professor of Obstetrics Temple University School of Medicine Philadelphia Pa. For record and address of author see "This Week's Issue" page 1250.

ter with an unusual weight gain that can be shown to a greater or lesser degree in my case that develops eclampsia or near eclampsia.

I think that we have gone far enough in these six years to maintain beyond contradiction that no woman develops eclampsia or pre-eclampsia whose fluid-balance and weight gain chart does not show this water-retention. We have demonstrated repeatedly that we do not get the symptoms of toxemia or eclampsia without it. We go a little further and say that so far as we have been able to discover the only *constant difference* between the normal woman and the eclamptic woman is this difference between the

demonstrated to our own satisfaction on so many of our own cases, that we no longer have any doubt in the matter.

Another way in which this fluid-imbalance may occur besides increasing the intake as will readily be suggested is by a marked diminution in the output while the intake remains practically the same. For various reasons the output may be suddenly diminished such as temperature changes, emotional conditions and various other factors that may occur any time during the pregnancy—and if no corresponding reduction in intake is made or some other provision for increased output as by bowel or skin there surely will be trouble.

Here is a chart (chart E) of a woman with every condition minimized as in normal pregnancy. She had a fluid-balance that is intake and output amounting to about 45 to 50 ounces at the beginning of pregnancy. After she reached the last five or six weeks it dropped to an average of 20 to 30. That is typical of many perfectly normal cases that we have followed through.

This chart also illustrates what we call a fluid balance. Not infrequently or is indicated a fluid balance is made to see if more liquid may be safely taken. This is done by increasing and sometimes doubling the intake for a day or two and noting the effect on the output. If the kidney response is satisfactory the larger intake may be continued. If not it should be reduced to the former amount or to such daily

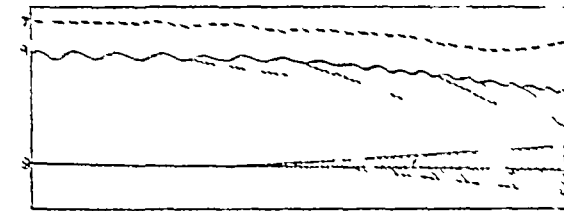


CHART 2

- 7 Fluid Intake Unchanged (or Increased)
- 8 Fluid Output Slightly or Abnormally Decreased
- 9 Abnormal Water-Retention, Weight Gain, Edema, Toxemia

normal and abnormal storage of water. Liver pathology, kidney changes, blood chemistry, blood pressure—none of these are constant—none are found in all cases, but abnormal water-retention is.

Maybe I am going a little far, but the truth of this contention has been so frequently

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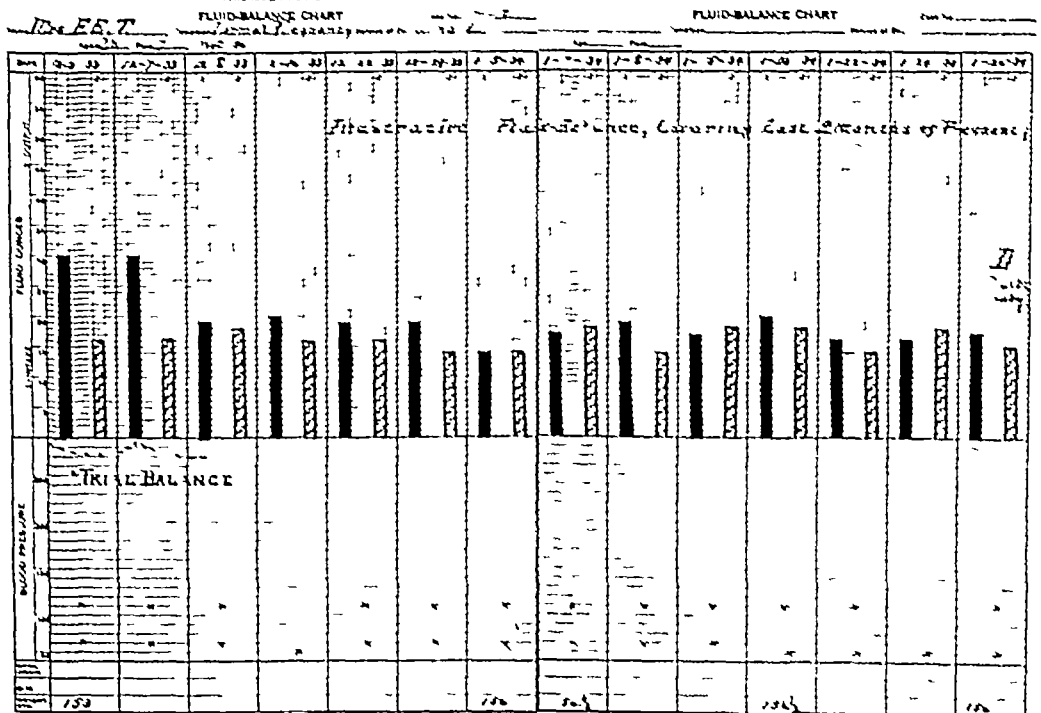


CHART 4

## NEW HAMPSHIRE MEDICAL SOCIETY

MORE RATIONAL METHODS IN THE PREVENTION AND  
CONTROL OF ECLAMPSIA\*

BY J O ARNOLD, M D †

*Mr. President, Ladies and Gentlemen*

LET me say to you that I keenly appreciate the opportunity and the privilege of speaking on the subject of puerperal eclampsia. I am keenly appreciative of the responsibility that it involves. Anybody who undertakes to say anything on this disputed question of the etiology and treatment of eclampsia, that is at all different from what is usually accepted, takes double responsibility. If he has something good, he has a real responsibility in trying to make it clear so that others may understand it. If it isn't anything worthwhile, his responsibility is to get out of the way of the other speakers as quickly as possible.

There are certain applications of general and well-known principles of fluid balance and dehydration upon which we have been working in this field of eclampsia, for a little over six years, and I will pass very rapidly over some of these that, I think, are essential to the understanding of what I shall have to say.

I am speaking as a clinical obstetrician, leaving to the research men of the profession the discovery and discussion of ultimate causes and factors that lie back of the principles that are involved in these newer methods of treatment. We feel perfectly justified in presenting to you these methods as effective measures for controlling the results of those ultimate factors or causes, even though we may not yet know all about what those causes are.

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Here we have represented the three factors chiefly involved in the very informal talk I shall present on this subject. This first chart

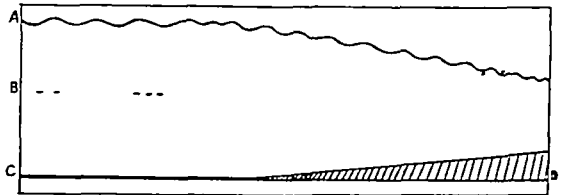


CHART 1

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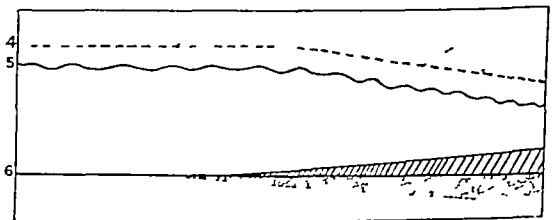


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- 1 Line of Fluid Intake—Abnormal Increase—"Pushing Fluids"
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found out, when she came into the hospital, something quite different. Of course, as you well know, there is an oliguria frequently about the time of labor and immediately after, and that is where we can easily produce our postpartum eclampsias, by too rapidly increasing the allowance of fluids, before the oliguria is overcome. Look at the enormous amounts of output here (over 100 ounces a day for a while). This woman did not appear to be edematous, and supposedly had followed closely the re-

of the seventh month, perhaps, or maybe nearer the eighth month. She had been going along perfectly well, and had not yet engaged a doctor, when a visiting nurse saw her. The nurse measured the urine, as nurses are taught to do, and found that there was an output of less than *three pints* a day, and advised that the patient must drink more water.

It so happened that she was living on the outskirts of Philadelphia. There was a spring nearby. "We have plenty of water, I can easily

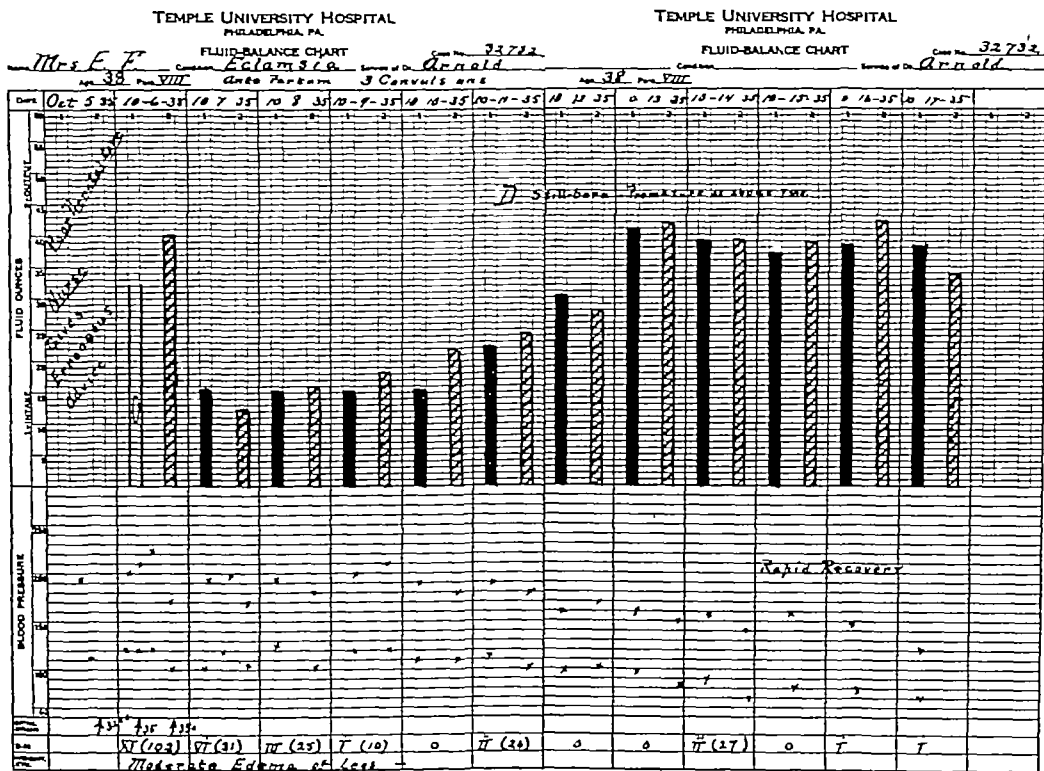


CHART 7

strictions, yet not closely enough, as she afterward admitted. She was spending the summer at the seashore, and her doctor was in Philadelphia. As she intimated, she was literally "between the devil and the deep sea", and as she afterward confessed, she was far from following the fluid-balance instructions given by her doctor. And this chart shows why she came dangerously near eclampsia, though she was professing to follow our treatment.

Here is another interesting case, which I shall bring in at this point, only as a comparison (chart 7).

A short time ago, a patient was brought into the hospital in eclampsia. You will notice that while most cases *gradually* develop their toxemia, this came on rapidly. We had this history from the woman, after her recovery. This was her eighth pregnancy and about the middle

of the seventh month, perhaps, or maybe nearer the eighth month. She had been going along perfectly well, and had not yet engaged a doctor, when a visiting nurse saw her. The nurse measured the urine, as nurses are taught to do, and found that there was an output of less than *three pints* a day, and advised that the patient must drink more water. It so happened that she was living on the outskirts of Philadelphia. There was a spring nearby. "We have plenty of water, I can easily

drink more water," she said. The nurse urged her, therefore, to drink quantities of water. In a week's time, she began to have headache and some edema, and in three weeks' time, we had her in the hospital in convulsions. We did three spinal drainings. Then we began our purgations. The three points in our regular routine are as follows: 1. Spinal tap for immediate relief, 2. hypertonic solutions intravenously, 3. hypertonic solutions by mouth, to dehydrate by the bowel. In so doing, we removed in the first twenty-four hours, after this patient came into the hospital, 142 ounces of fluid (in the bowel content and in the urine output). We kept her, of course, very much restricted on fluids, and continued to purge her daily for three days, and she rapidly improved. This woman had no more convulsions. But here (referring to chart 7), on the fourth day,

quantity as will maintain the always safe fluid-balance

In this particular case, as you see, there was not the response to the trial balance, so we continued to carry this woman on a relatively small quantity of fluid, but with absolute freedom from any symptom or danger sign, and with so

maternity case (chart 5), that corrects this wrong impression. This young woman in her first pregnancy was put on a strict fluid balance, as early as the second month, because of her epileptiform seizures, of which, by the way, she had none during her entire pregnancy. I cite this case because, for the reason given, we

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GRAPHIC CHART

Case No.

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GRAPHIC CHART

Case No.

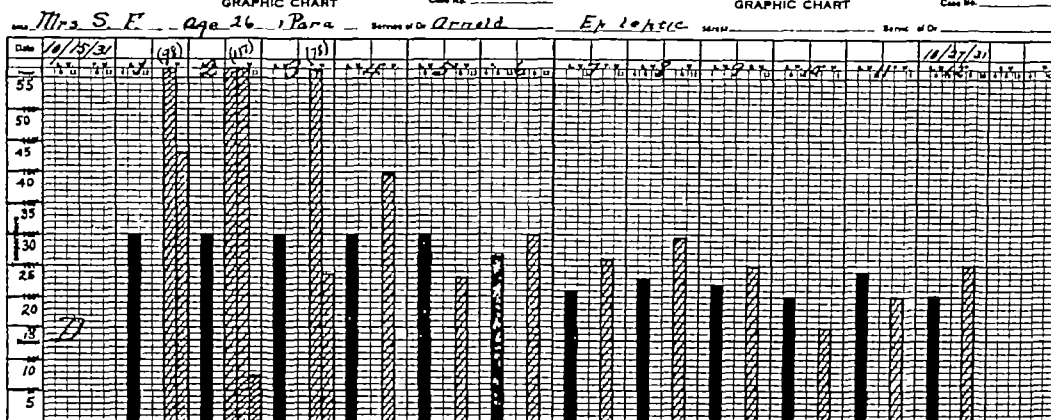


CHART 5

little weight-gain in the last two months, that in spite of the fact that she was a hale and hearty young woman of good size, weighing 136 pounds at the beginning of pregnancy, she only weighed 156 pounds at the end of pregnancy, and gave birth to a large baby. Of course, you know without my mentioning it, that we estimate

were very careful to keep her down to a fluid-balance of only about 30 ounces a day for many months. She was delivered at term, perfectly normally. She did not show any visible edema. Surely this patient has no water storage, but look at her postdelivery output chart. Here are 98 ounces in the first twenty-four hours, nearly

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GRAPHIC CHART

Case No.

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GRAPHIC CHART

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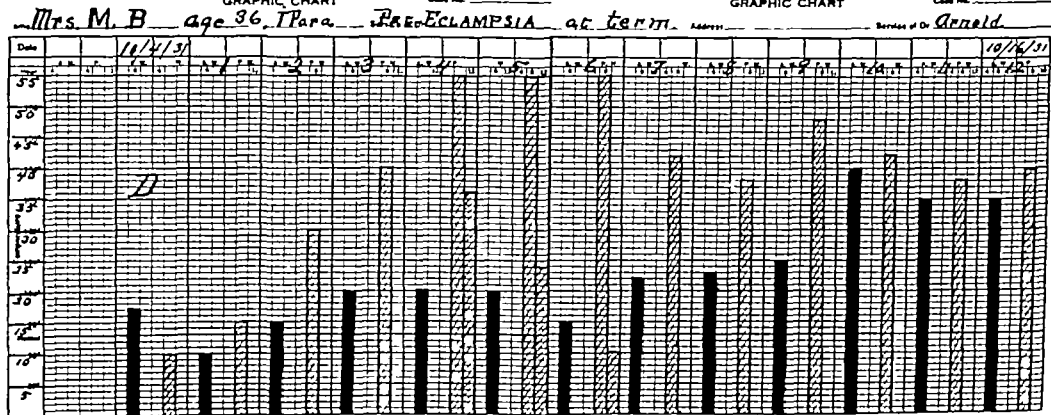


CHART 6

the amount of weight gain by the estimated size of the baby. If we estimate a 7 pound baby, our patient is entitled to twice that weight, or fourteen or fifteen pounds, and so on, according to the size and type of patient.

Now, even though you may have patients who appear to have no edema, and therefore a contradiction to the statement I made a while ago, I want to show you the chart of a woman who happened to be an epileptic, as well as a

as many the next, and so on, for several days, far more output than intake, showing an unbelievable water-retention, even with a very limited intake (indicating on chart).

I want to show you this chart (chart 6) just to show another patient that was bordering dangerously near what we would call an eclamptic or a pre-eclamptic state, and yet, did not give visible evidence. We thought she was following pretty closely the restrictions on fluids, but we



along is to insist on five small meals a day, with a good general variety of diet—meat milk, eggs, cereal vegetables and fruits. We do not bother much with the kinds of foods, so long as they are fairly reasonable, but we *do* bother with the amount of fluid intake. The chief restriction is on salt and sweets—these are kept rather low.

Substandard risks though apparently well  
History of predisposing disease or previous  
pregnancy complications Organically abnor  
mal or questionable before pregnancy Evi  
dence *now* of active or latent organic dis  
ease

Explain possible dangers and need of unusual care Start fluid balance at once—do not wait for indications Teach patient to make and be guided by frequent F B tests Watch weight gain blood pressure kidney function Insist on quality of food not quantity—5 small meals Meat milk eggs cereals vegetables fruits—low in salt and sweets

call the "substandard risks" though they appear perfectly well and healthy now the ordinary tests of the urine, kidney function and so on, revealing little or nothing abnormal.

There is one other point that I wish to suggest here, and that is the matter of eveground studies, which will reveal that they belong to this class sometimes when nothing else will. In these patients that have any of the history as I have indicated, we watch the weight control and start them at once on fluid balance and carry them safely through.

One of the very best devices for helping this

Here is a patient (chart 11) who demonstrates what can be done in the way of prevention by this method. This woman came in at the age of thirty-two, it was her fourth pregnancy. She had had two attacks of eclampsia, and lost both babies. Another time she had aborted and lost that baby. She is the type of patient who, while apparently well, is potentially dangerous.

We carried her through the pregnancy without a symptom, and without ten points variation in her blood pressure, and gave her a normal, healthy child at term. She was sent in for abortion. She had albuminuria and occasional casts, but she wanted a baby, and she was willing to follow instructions, and we were able to carry her through to term, without the slightest difficulty on strict fluid-balance methods.

This and other cases like it, had I the time to review them would at least do something to counteract the statement that has been so largely made that we do wrong in permitting such women to go through pregnancy, because we greatly shorten their lives.

This woman we have watched closely for the past five years and she is in as good health



she was delivered of a stillborn baby. The damage had already been done. Unfortunately we find that is too often the case, if the woman is allowed to go to such serious conditions, and allowed to have convulsions. Here, then, we had a very intelligent woman, who hadn't a symptom or a sign of trouble until the nurse began to urge upon her the intake of more fluids to produce a larger output of urine. The unfortunate thing was that when the nurse saw the change taking place, and advised her to go to a physician, the physician likewise, ordered a purgative or two and said, "You must drink more water and flush out your kidneys. You must get them working."

I show this slide (chart No 8), in order that you may better understand some of the things I am going to say. We have simplified, for practical purposes, the classification of these cases, and have not attempted to base them on the pathology which is still so much in dispute. We place all patients in the following five groups

#### CLASSIFICATION OR GROUPING OF PATIENTS

- I THE INHERENTLY NORMAL  
Prenatal trouble unlikely
- II THE POTENTIALLY ABNORMAL  
Trouble probable, but preventable
- III THE MODERATELY PREECLAMPTIC  
Trouble in moderate degree now
- IV THE DANGEROUSLY PREECLAMPTIC  
Alarminglly near the crisis
- V THE ECLAMPTIC OR CONVULSIVE GROUP  
Have reached the culminating crisis

#### CHART 8

1 The inherently normal, nothing discovered abnormal at the beginning of pregnancy, or in the history, that would affect the pregnancy

2 The potentially abnormal. This is a most important group. It seems to me that it is here we need to learn some of our most practical lessons. If we have done anything more important than the actual treatment of these cases, it is in their prevention, it is in emphasizing the great importance of grouping these two classes separately—separating the *potentially dangerous* patients, from the *normal* patients. All those who have a history that might in any way suggest a low reserve kidney, for instance, or previous difficulties in pregnancy, or possible nephritis-producing disease. The moment we get such patients early or late, we put them at once on a fluid-balance, and maintain that throughout the pregnancy, and even though they have diseased kidneys, or impaired kidney function, we do not fear to carry them safely to

term, or near term, having been forewarned, and having taken the measures to prevent the condition that will bring the trouble.

Let us take the inherently normal patients

#### I THE INHERENTLY NORMAL

Normal organic health before pregnancy  
Nothing in history predisposing to complications  
Nothing discoverable *now* suggesting active or latent disease

#### Treatment

Note weight and blood pressure now—and before pregnancy. Explain prophylactic importance of prenatal care. Correct erroneous notions as to diet, fluids and kidney function. Point out relation of fluid balance and weight control. Limit weight gain in 3rd trimester to approximately one pound a week. Expect patient to remain 100 per cent free of toxemia.

#### CHART 9

for a moment. The usual general prenatal care will carry them along, provided we do one or two things to correct the erroneous notions as to the *diet* and *fluids*, and *kidney functions* which prevail from the erroneous teachings that you and I were largely responsible for in the past. I know that I have done my full share of urging patients to increase fluids, and to cut down on protein, and a lot of that kind of advice in which we do just the opposite now.

We point out the relation of the fluid-balance, and the weight-control. Our most valuable office equipment now, is not the urinalysis outfit, nor is it the sphygmomanometer. It is the *scales*. The watching of the weight, the rate of weight gain, is of more value, it appears to me, in the light of what we have found in recent years, than anything else. Of course, we have cases where there is undoubted evidence of pathology in the kidneys, to begin with. We may have various types of symptomatology, of high blood pressure, and so forth, and still have a relatively safe patient, *if* we maintain strict fluid balance and weight gain control.

Therefore, in our own cases, we want to know, if possible, in the beginning, what the weight was before pregnancy, as well as the blood pressure, and to watch the gain in weight, allowing no more than a pound a week in the last trimester, we very frequently allow no gain at all in patients who appear to demand it, and not only that, but, as many of you know, we now have patients in whom we *reduce* the weight right through pregnancy, in spite of their gain. We did this, to the extent of thirty pounds in one patient, with the *best* of results. In this way, we can greatly reduce the size of her baby or prevent its oversize, as I shall perhaps have occasion to refer to later.

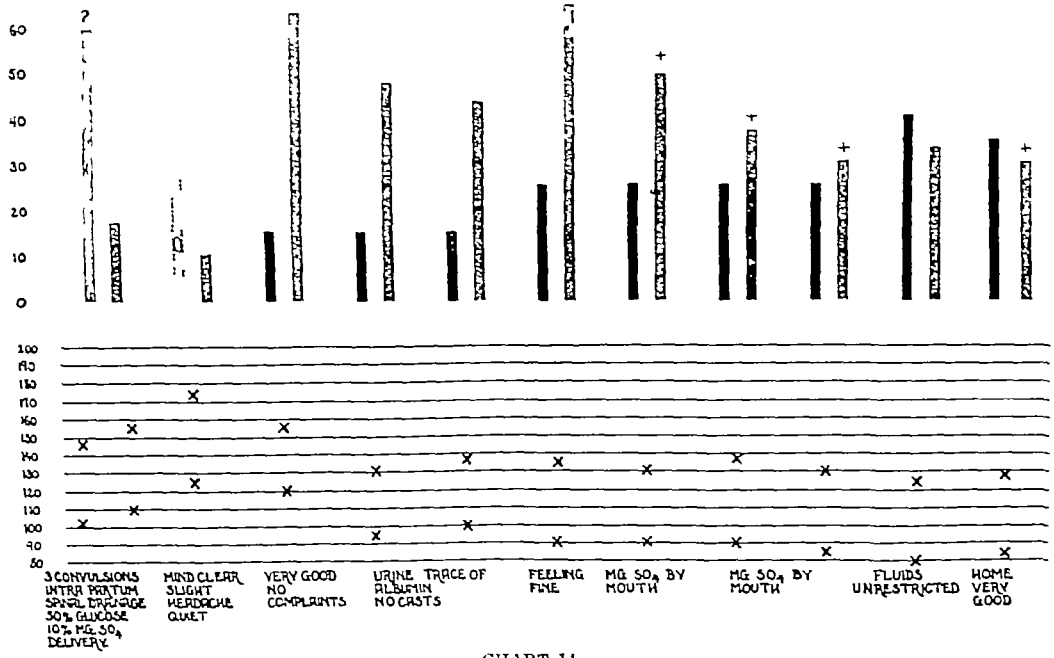


CHART 14  
Mrs C H Age 26 Para I At term  
Temple University Hospital Service of Dr J O Arnold.

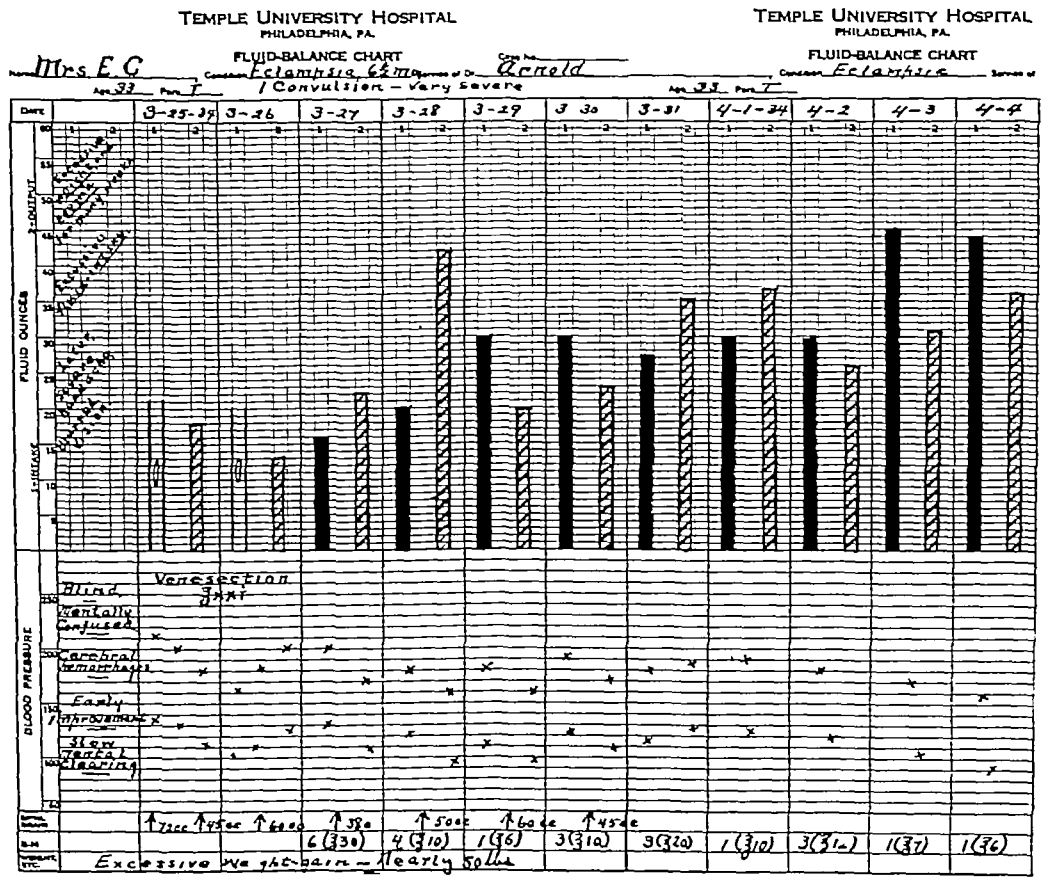


CHART 15

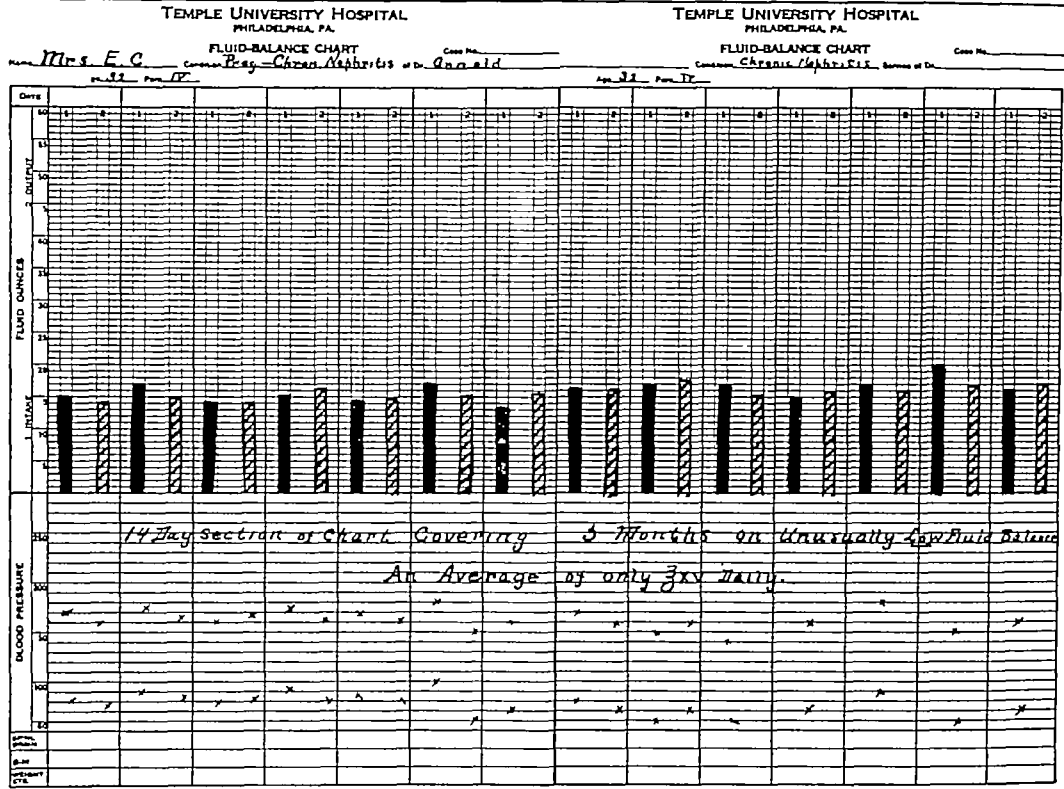


CHART 12

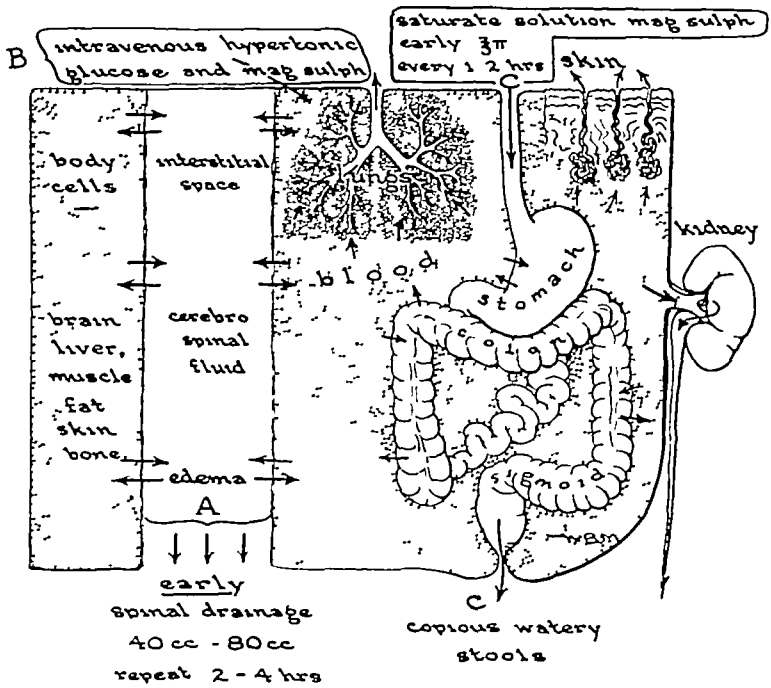


CHART 13

today as far as anybody can determine, as she was before going through that pregnancy, and I can say in better health than she was at the time she came to us. She has a fine, healthy child, and even though her life may be shortened a few years—although there is no indication now that it will be—she has had the pleasure of at least five years of motherhood, because we found a way to carry her safely through pregnancy, and even if she does not live to old age, she has left another valuable life in her place, which I am quite sure would not have

various manifestations seen in eclampsia, or in conditions leading up to eclampsia

Here is what we do We temporarily drain this fluid (indicating on chart) by spinal tapping, making from one to six or seven drainages, as the necessities of the case may indicate This is done, as a temporary relief, usually, while we are waiting for the other and more permanent dehydrating methods to work Hypertonic intravenous solutions carry the water over into the bloodstream, which, of course is only of momentary benefit, unless an early avenue of escape for this blood-borne water is

water into the blood, but they have not provided for the satisfactory outlet for that water through the bowels It is just as important to use some method for getting water *out* of the blood system, for example through the gastrointestinal tract, as it is to get it *into* that system

We have seen case after case in which the output of urine was so extremely small that we have been implored by our friends, especially on the medical side, to use these newer diuretics, but we have maintained that the kidney is not to blame, and that if we succeed in getting dehydration early enough, the kidney action will

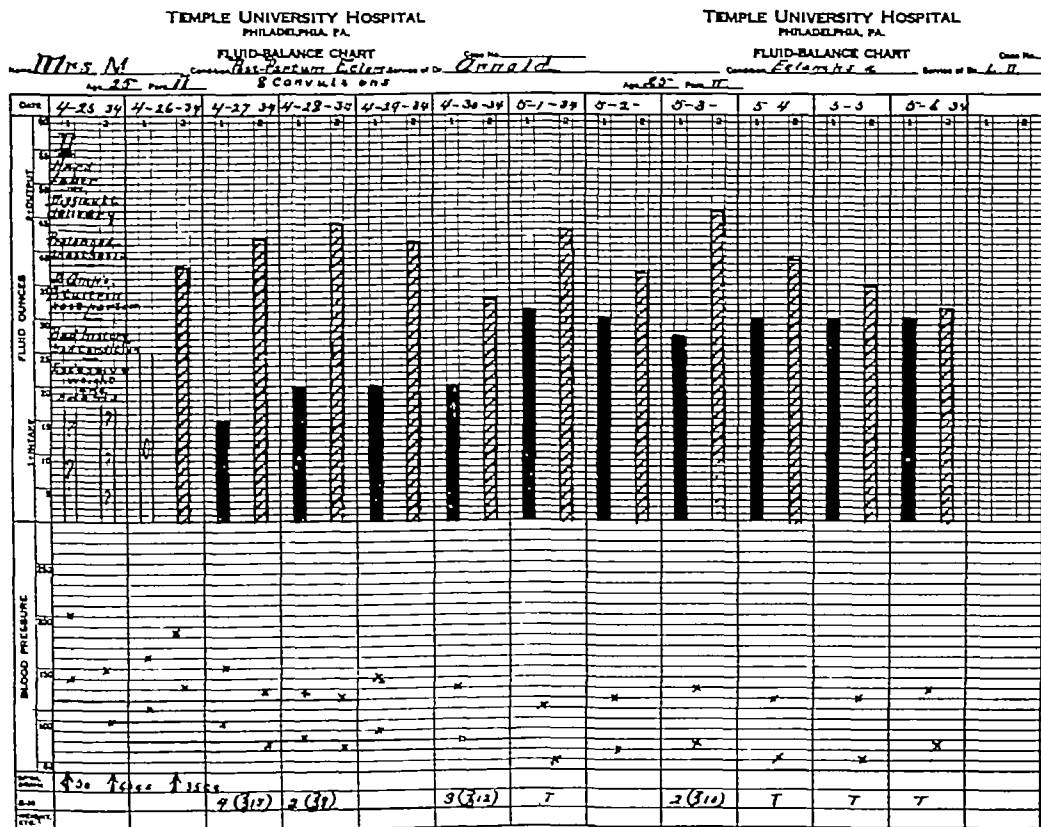


CHART 17

provided through the bowel We usually ignore for the time, the kidney action We do not bother giving diuretics, for relief must come *earlier* than the kidneys can provide it

The moment we begin to do spinal drainage we begin to give intravenous solutions Then we start, likewise as early as possible, to give a saturated solution of Epsom salts by *mouth*, to get drainage started from the bloodstream through the bowels *It is just as important to get the water out through the bowels as to get it into the blood* That is one of the points on which I find a good many have failed They have reckoned on the glucose and magnesium sulfate as therapeutic agents in themselves instead of merely dehydrating agents, attracting

return to what it is capable of doing, depending, of course, on whether it was a *normal* kidney to begin with

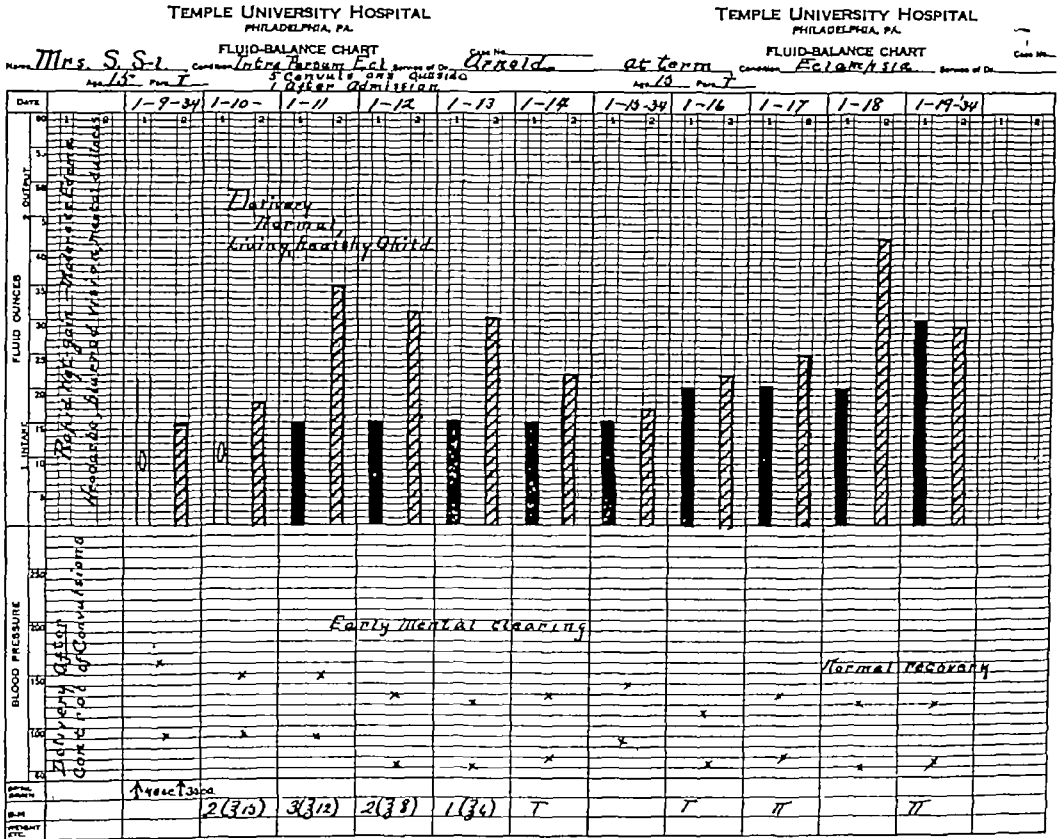
Also, note this point We give 50 cc of 50 per cent glucose, alternating in two hours with 20 cc of 10 per cent magnesium sulfate for about three or four doses We do not give magnesium sulfate long, not more than three or four doses intravenously any more, and the saturate solution by mouth as often as will be necessary to secure watery purgation I should like to speak longer on this, but I know I must hurry

My next chart (chart 14) is one of our first cases of eclampsia to be treated after this method was put into force I show this chart chiefly be-

been the case had we aborted her, and *maybe* the added joy of *motherhood* for a few years, will overbalance longer years *without* motherhood

The next chart (chart 12) is that of a poor woman from the dispensary, on a five months' fluid restriction, and a most remarkable case. We kept this woman on an average of fifteen ounces, fluid-balance, for five months, and gave her a living child, whereas she had lost the fetus in three previous consecutive pregnancies. She

I should like to show you, at this time, one of Dr Fay's diagrams (chart 13). I must take this opportunity to say that I owe my interest in this work, to Dr Temple Fay. It took about a year and a half of persuasion and coaxing on the part of Dr Fay to get me to try out dehydration in eclampsia. I felt pretty well satisfied with our results, and with our mortality, by the old conservative methods (more than four times as high as we now have), and it was hard to feel that a change might be advantageous,



has chronic nephritis, and chronic hypertension, from which she suffers as soon as she becomes pregnant. We do not expect to affect that materially, but we *do* know that in following up this case, if we increased or doubled her fluid allowance, this woman's symptoms would immediately begin to return, in fact, on at least four occasions in the nine months we had to bring her into the hospital, and instruct her on keeping a balance. She was of the type *mentally*, to make her one of our most difficult cases, and yet, we demonstrated that by fluid control alone, such a case *could* be carried through safely.

So much to indicate what can be done with a class of patients usually considered impossible in the prevention of eclampsia.

but Dr Fay kept after me until I finally did try it, and I have felt very grateful to him ever since.

A glance at this diagram will, I think, give you an idea of the principles on which we base the mechanics of this work. Let this represent the three compartments of the human body, in which the water is contained. We are not particularly concerned with the water content of the body cells, or with that in the bloodstream, which is more or less unchangeable except very momentarily, but we *are* concerned with the water content of the cerebrospinal system and that stored in the interstitial spaces of the body, in other words, the *excess* of water, producing edema and intracranial pressure, disturbing the cerebral functions and resulting in the

We have not done a cesarean for eclampsia in the six years that we have practiced these methods. I do not know that we may not, sometime, but if we do, it will probably be because she has another indication for it, in addition to the eclampsia. We used to do it, but we feel now that we can avoid the necessity for it if we properly dehydrate these patients, and we have been able to do so now, in something over 230 cases.



(1) *That we know exactly what we want to do*

cause it has a point or two that I should like you to understand. This woman came as near demonstrating the results of experimental forcing of fluids as we could get anywhere. She was a young woman of twenty-six, in her first pregnancy, and absolutely free of symptomatology as late as the beginning of labor, when I saw her and went carefully over her case. There was not a sign of edema and not a complaint, except of the labor. She had a breech presentation, and the interne asked me to see her to verify his diagnosis of breech, and to give a prognosis as to the labor. That was at ten o'clock in the morning, and at two o'clock, he called, stating that the patient we had seen so normal in the morning, was having the most furious convulsions. The orders were as follows: "That is the patient we have been waiting for, for nearly a year. Give no sedatives, give intravenous solutions, and get ready for spinal tap." By the time I got to the hospital, he had already made the drainage, and the patient had, in less than an hour after the spinal tap, regained consciousness, was perfectly clear and rational, and was going on with her labor. In three hours, we did another spinal drainage and found by that time that dilation was complete and labor had progressed to the extent that we felt it would be wise to complete the delivery. After the second tap, with the needle in place, spinal anesthesia was given, and we delivered the woman perfectly painlessly under spinal anesthesia. She tells us to this day what a wonderful delivery it was, because she could lie there and know all about it, even hearing the baby cry, and felt no pain.

Referring again to this chart, the point I want to make is that this large line (indicating), represents an *indefinite intake*. This was a hot July day, and she said that she drank "gallons of water" at home, and when she came into the hospital, the nurse placed a pitcher of ice water on the table alongside of her bed and she continued to drink *ad libitum*. So, in twelve to fourteen hours, she literally drank herself into convulsions. She had stored a large quantity of fluid against an output which had dropped down to a very few ounces. The attack was of very short duration, for we knew the cause, and began effective dehydration at once. There was no time for the development of pathology here, and we found none. She returned to normal consciousness very quickly and made a very good recovery, with no evidence, in the urinalysis, of any kidney involvement. She had only been a few hours under the destructive influence of this condition. We knew that by removing the water and giving her none for twenty-four hours, that we would undoubtedly take away the cause of her convulsions.

I do not believe this was a mere coincidence.

I do not believe that we "diluted the toxemia" in this woman's blood and therefore relieved her, by giving more fluid. I do not believe that she would have made such a rapid recovery under any other method of treatment that we might have instituted at that time, because we have had occasion many times since then to verify such methods, and to repeat the results in similar cases. None, perhaps, was ever quite so strikingly instructive as this one.

Let us contrast this case with a primipara 33 years old, who had reached six and a half months (chart 15). There is a whole story in this case that I haven't the time to dwell upon. She was blind, and mentally confused. She had one convulsion at the time she reached the hospital. She was excessively edematous. She was a typical case of one who had been neglected and allowed to accumulate a large excess of fluid in the body,—probably nearly 50 pounds weight-gain. She was one of the worst cases we had, although she had only one convulsion.

For forty-eight hours we gave her no fluids. We found there were but twelve ounces of urine in 24 hours. We did a spinal tap of 72 cc, and four hours later, 45 cc, the next morning 60 cc, and we continued to do daily a drainage of 45 to 60 cc until this woman had completely cleared mentally—seven drainings in all.

I am frequently asked, "How long do you drain, how much, and how often?" If one draining gives relief, that is often enough, but as in the patient whose chart I have just shown to you, many more are sometimes necessary.

In this last case, we found there were undoubtedly cerebral hemorrhages, so we continued to drain until the spinal fluid became clear. She was several weeks recovering her eyesight, whereas the other woman recovered in a few hours. But this woman had been months on fluid imbalance, which could easily have been prevented, I am persuaded, as in hundreds of other cases, if, at the beginning of edema and rapid weight gain, there had been restriction of fluid, a fluid-balance established, and in addition, dehydration to the extent necessary to keep the weight down. She made a complete recovery. I have been watching her since from time to time, and I have seen no evidence of any permanent injury from her very severe attack.

Here is a case of a young woman in convulsions (chart 16), who had about five outside, and one after she was admitted to the hospital. We think that we are not doing very well if we permit more than one or two convulsions after the case has been placed under our care. I recall a patient in whom there was considerable disappointment, because she had been in the hospital three hours, and they had



no increased intracranial pressure. About 2 cc of spinal fluid was evacuated and the fluid pressure was so low that it would not appear in the manometer.

PRESIDENT ABBOTT Discussion will be continued by Dr Robert O Blood of Concord.

DR. ROBERT O BLOOD To follow on a subject as important as this men like Dr Arnold of Temple University and Dr Burpee of Manchester is a big job. It is such an open question with so much difference of opinion that it is hard to get a large group of us to agree on any one set type of treatment.

It seems to me however that Dr Arnold today has given us a high point to aim at a lowered maternal death rate which we all desire and which is quite necessary in every state and especially in this state perhaps.

Dr Burpee has told you that one in every four eclamptic women in this state died of this condition.

I believe the greatest thing for us to aim at is not the curing of the disease eclampsia but the treatment during pregnancy. It is entirely possible by the older methods which we have been using to prevent many cases developing convulsions. It is apparently from Dr Arnold's paper easier now to control this type of disease than it has been in the past.

It was tremendously interesting to me this morning to listen to Dr Arnold and to hear him tell us that a control of the fluid intake was so important. I think few of us realized that this was important. I have seen my patients gain weight and told them that it was quite natural they should gain weight without thinking too seriously about the amount of the gain. I think we are all doing this.

We who practice obstetrics in New Hampshire should consider more seriously all of the preventive methods and we should consider more seriously our individual qualifications. We should especially consider taking postgraduate work in this field as we would do if we were practicing surgery or any other field of the profession.

Dr Arnold has given us a great deal to think about and I hope that many men in this state will follow his treatment and will get his book and try out this method.

We of the Committee on Maternity and Infancy should like to know during the next year how many of you have tried the treatment, what your results are and whether you are satisfied that Dr Arnold is on the right track.

I wish that Dr Arnold might tell us in a little more detail how we could use the treatment in the periods before delivery during the fifth sixth seventh and eighth months and especially whether it is necessary to figure the amount of fluid lost through the dejections as well as the kidney route also a little more on just how he measures or rather how he has his patients measure the amount of fluid intake and output. Those two things I think are important.

I think we are all happy to have had Dr Arnold with us. He has given us a great deal to think about. I should like to hear from him a few minutes along the line of how we shall use the treatment in our daily practice.

I also hope that we shall have the pleasure of hearing from him again at a later date.

PRESIDENT ABBOTT I shall now call upon Dr Arnold to close this discussion on this paper.

DR. ARNOLD Mr Chairman—I appreciate this fine discussion. I should like to answer some of the ques-

tions that have been raised by Dr Burpee and also some of the other questions.

We use a set of simple blanks like this one which I show you and find it quite easy to teach our patients how to measure the intake and output and record it on this blank. This plan of having our patients eat five times a day—eating nothing and drinking nothing at any other time—has helped a lot, too. Sometimes there is a little difficulty to get this going but once you get the patient started it is a most helpful device.

We find these methods comparatively easily taught to our private patients. They soon come to understand that all eating and drinking must be done at these definite times—breakfast midforenoon lunch midafternoon and evening—with no big meal at any time. The intake allowance with the five-meal plan is easily apportioned—as for instance 20 ounces a day is six ounces of fluid with each little meal. The patients who are placed on an allowance can be much more easily carried through if they are on this definite three-hour schedule with nothing between times.

We have our patients bring their fluid balance reports to us from time to time and usually find that they become very much interested in keeping these records.

For instance a woman of the potentially dangerous type having had eclampsia twice with the loss of her baby each time wanted a baby very badly so we put her on fluid balance very early. She said she was passing plenty of urine because she was drinking lots of water. I gave her a chart and explained how to keep it what she should do and so forth. When she brought in the first report at the end of a week we found that the intake was about 75 or 80 ounces and very much to her surprise the output was less than half of that 32 ounces. Now such an experience is a revelation to a patient and once we get them to understand it usually there is not any more trouble nor was there with this woman throughout the remaining seven months of the pregnancy. She learned how to keep perfectly good and safe and had no sign of toxemia.

You say the water content of the food must be reckoned with. That is true but usually there is also an unmeasurable quantity of elimination of fluid through the skin so that one more or less balances the other for all practical purposes.

In the extreme cases we do restrict them to a more or less dry diet. We do not have the patients live solely on fruits and vegetables which are almost entirely water. We give them proteins. Take the patient whose chart I showed you who went through so nicely after three failures. We insisted that she eat meat and proteins and that she keep low on fruits and vegetables. The results were very satisfactory.

I believe you will be surprised to see when you get this information to them so that it is tangible just how much interest they will take and how they will help you and help themselves.

Now lest there might be some misinterpretation of this subject I don't want you to go away from here and say that I maintain this is a cure-all for everything that can happen to a woman in the child bearing period and that if a woman has a chronic nephritis or any other serious chronic kidney disease or tuberculosis or heart disease and happens to become pregnant that we are to start in and treat her for the pregnancy and ignore her organic disease. These methods may help her in the course of your treatment for these diseases but remember that you are treating that cardiac disease or that

(2) *We know equally well why we want to do it*

(3) We think we know, after these years of experience, *how to do it efficiently*, and so thoroughly that we have reduced our mortality to *less than one-quarter* of what we thought was a good maternal mortality, under the old methods

I feel very seriously about this problem and I hope that even though I have had to hurry very rapidly over a part of this subject, that I have, at least, excited interest enough that you may investigate further and try it out in your practice. If it is all wrong, you, who do the work, will prove it so. If it is *right* (and I am sure you will find it is), you have no right to follow the older and more irrational methods that still largely prevail throughout the country.

I have some booklets that outline this treatment, and if any of you would care to have a copy, I shall be very glad to have you take one.

I want to thank you for your indulgence.

#### DISCUSSION

PRESIDENT ABBOTT Discussion on this paper will be opened by Dr Benjamin P Burpee of Manchester.

DR BENJAMIN P BURPEE In all medicine there is probably no single condition as yet so obscure both as to etiology and treatment as that of eclampsia. Not more than three or four years ago De Lee made the statement that in two decades not the slightest advance had been made in discovering the cause or in improving the treatment of eclampsia. This is probably much too pessimistic an outlook, because progress is undoubtedly being made. Yet it is a fact that there are a great many different ideas and theories making the entire subject a very difficult one for the ordinary practitioner to clarify and correlate in his own mind.

For this reason I am sure that I voice the sentiments of all those members of the Society that are interested in the practice of obstetrics, in saying that we are grateful to Dr Arnold for his paper and for the work that the Temple Clinic has been doing in the last few years along this particular line of theory as to the etiology and treatment of this condition.

The toxemia theory which I believe was first advanced by Bouchard in 1837 was never very clear cut or definite. The 'toxin' was a loose term applied to a certain something circulating in the blood and affecting the various organs of the body producing the symptom complex.

The hypophyseal theory has many advocates. Authors have shown that the administration of hormone substances from the posterior hypophysis will produce in animals a symptom complex like eclampsia even to the pathologic changes—without actual convulsions—also that the hypophyseal substances controlling water exchange and blood pressure are present in increased amounts in the blood of eclamptic women. Yet we have no definite proof that the administration of pituitary in toxemic cases will produce convulsions. Other authors agree that practically all eclamptics will show excessive amounts of prolactin in the urine and blood and that most of them will show a decreased estrin.

Many authorities disagree with the use of the lumbar puncture during convulsions, holding that in these eclamptic cases manometric readings fail to show an increased pressure, and also that in their experience the use of the lumbar puncture has failed to show results. Some pathologists also fail to agree that all eclamptic brains at autopsy show edema.

With such a divergence of opinion as to etiology and treatment, what is the ordinary practitioner to accept? The ordinary run of physicians doing obstetrics must leave to the skilled man with a large amount of material at his command and the facilities for scientific laboratory work, the matter of settling the question of etiology.

For us, who do an average amount of obstetrics the task is to see to it that each patient receives the best prenatal care possible, adhering strictly to what we call the ordinary standards of prenatal care as a minimum. Frankly there is room for improvement in this State. Our maternal mortality from eclampsia is too high. Ten women out of a total of 45 deaths in this State last year died from eclampsia. Some of these deaths were the fault of the patient. The doctor cannot be held responsible for a death if he does not see the patient until she is in convulsions. However, I firmly believe that the incidence of true eclampsia with convulsions will be small if we all give our patient the best attention that we are capable of, and if—and I believe that this is of extreme importance—we do not hesitate too long in inducing labor on the toxemic patient that is not doing well under medical treatment. Regardless of what the thing may be that is in the maternal system and producing the symptom complex whether it be a true toxin or a hormone or some indefinite condition, it will not continue to develop after the placenta is detached and I feel that we are violating one of the axioms of medicine when we do not remove the cause. Not so many years ago the teaching was that the uterus must not be emptied until the convulsive condition had been controlled. Now the pendulum is swinging quite a bit toward the immediate emptying of the uterus. Why is it not possible and feasible to treat the condition by whatever appears to be the logical method at the same time inducing labor? In the ordinary patient and I mean in a multipara with previous normal labors or in a primipara with the head down and no evidence of disproportion, it is pretty generally accepted that the method of choice in starting labor is by simply rupturing the membranes. If there is fear of disproportion or of getting into trouble by this procedure or in early cases to avoid the increased likelihood of intracranial hemorrhage in the fetus if delivered from below as a premature cesarean section is advisable. The consensus is very much against section in eclamptics. Most authors caution us against doing it. Why? I don't ever remember seeing any reason given why we should not do it. We have been cautioned against many things in obstetrics in the past few decades that are now accepted as quite orthodox procedures. At any rate I would like to make a plea for the earlier intervention in toxemic patients both in the interest of the patient in preventing continued damage to the various organs and also in the interest of the fetus because a baby will not remain alive in the uterus always to term in the presence of a toxemia and to my mind there are far too many stillborns that might have been saved had labor been induced at an earlier date.

It may be of interest to note that my only experience with manometric readings in eclampsia occurred about two days after the reading of this paper in a primipara with sudden severe eclampsia and three convulsions. In this one case there was

no increased intracranial pressure About 2 cc of spinal fluid was evacuated and the fluid pressure was so low that it would not appear in the manometer

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kidney disease primarily, and the pregnancy is merely an incident, and its removal early in the pregnancy may be necessary

I saw such a case with my good friend, Dr Bland of Jefferson Medical College, only a week ago. This patient appeared to have been perfectly normal before pregnancy from the report given by the family doctor. Very early, at about the fourth or fifth month, she began to have evidence of serious kidney involvement, and soon after that, eye involvement. Undoubtedly, that woman had a serious type of kidney disease and was not a case to be treated purely as a pregnancy. I didn't hesitate a minute to say to my friend, Dr Bland, that that was a type in which I believed the emptying of the uterus—therapeutic abortion—was absolutely necessary.

When a woman develops eclampsia, or near eclampsia or any of these so-called toxemic signs before the fifth or sixth month, there is more to do than merely apply the principles of water balance. She has organic disease to be treated.

Now with regard to the mortality or the effects on life from not emptying the uterus early in these organic cases, do not lose sight of the fact that such figures were all compiled under the old methods of treatment. We are accumulating, as fast as we can, from all over the country, data on cases with which to compile a report on our treatment. I am very grateful to those who have reported to us from here and there throughout the country their experiences. After a time, we shall accumulate enough for a report. But these mortality rates that our good friends have been giving us are based on methods of treatment that are entirely the opposite, usually, from the dehydration and fluid balance treatment.

While we have had a comparatively limited number of organically diseased, up to this time, that we have carried through yet there have been enough to convince us that the results under these methods will have a different mortality rate from the results that were obtained in the older methods.

There are a number of points here, such as that eclampsia does not exist if the placenta has been removed or detached, or when the pregnancy is terminated. I would seriously question that. We have postpartum eclampsia as much as a week and two weeks after delivery. Eclampsia has often been produced postpartum, by pushing fluids before kidney action has become normal.

Someone said to me the other day, "Why may not a woman have eclampsia, regardless of pregnancy?" She may! We had one a few months ago at the hospital, demonstrating that this can be true. This woman had been married seventeen years and was in her seventeenth pregnancy. In a number of these pregnancies in the past, she gave a history of having had kidney involvement, or toxemia, or something of that kind. Now she gave this definite history. In the three months before this pregnancy had begun, she began to have symptoms of eclampsia. She had two typical *eclampsoid convulsions* from the description given. And why shouldn't she have? I said to her, "What do you do when you are not having babies?" She said, "I belong to the ward committee of the Women's Political League." How often do you have meetings?" "We have meetings every night."

Then I questioned her further. "Do you have plenty to eat and drink at these meetings?" Yes, we always have plenty to drink and something to eat." How much or what do you drink? "I drink beer, or whatever we have, six or eight glasses a night."

So the history was that this woman was loading on large quantities of fluid every night in the week

and her kidneys, through years of injury and repeated pregnancies, one after another, had been crippled. She did not reckon with the fact that they were beginning to put out less and less fluid and, as she got a little older, this condition was beginning to produce an overhydration which gave her cerebral disturbances, and finally resulted in the convulsions—not typical eclampsia, but typical in the mechanism of their production.

Of course, the moment a pregnancy is added to all this, the condition grows rapidly bad. She had a pressure of 210 and a violent headache, and after seven days, we sent her out of the hospital relieved of this without a dose of medicine, except to purge her and greatly restrict her fluids. We watched her for a time and then lost track of her.

Again I want to thank you for your much appreciated interest in this subject.

## RECENT DEATHS

**LUCE**—THOMAS WARREN LUCE, M.D., of 82 Court Street, Portsmouth, New Hampshire, died at his home, December 11, 1936.

Dr Luce was born in Readfield, Maine, February 15, 1870, the son of Daniel and Emily (Ladd) Luce. He was educated at Kents Hill Seminary and took his M.D. degree from the Bowdoin Medical School in 1895. He practiced in Portland, Maine, and East Rochester, New Hampshire, before settling in Portsmouth in 1900.

His memberships included the New Hampshire Medical Society, the American Medical Association, the Rockingham County Medical Society, the American College of Surgeons, the New England Surgical Society and the New York and New England Societies of Railway Surgeons.

Dr Luce had been president of the State and County Medical Societies. He had many civic associations among which were the following: Vice-President of the New Hampshire National Bank, membership in the New Hampshire Historical Society, the Federal Fire Society, the Masonic Order and the Portsmouth Country Club.

He married Miss Nettie M. Leighton, daughter of the late Adam P. Leighton of Portland, Maine.

Two daughters, Mrs. Isadore L. Smith of Ipswich, Mass., and Mrs. Emily E. Pierce of Long Beach, California, and one sister, Miss Gertrude Luce, survive him.

**DUNCAN**—CHARLES DUNCAN, M.D., of Concord, N.H., died at his home, November 13, 1936.

Dr Duncan was born in Chelsea, Massachusetts, in 1872, graduated from Dartmouth College in 1898 and from the Harvard Medical School in 1903. He served the State of New Hampshire first as pathologist and bacteriologist and later as secretary of the Board of Health and the Board of Registration in Medicine. His death ended the longest term of service to the State of any of its officials.

Dr Duncan was a member of the Dartmouth Alumni Association, the Theta Delta Chi and the Casque and Gauntlet fraternities.

His widow, a son, two daughters, a brother and two sisters survive him.

## CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 22521

### PRESENTATION OF CASE

A 52 year old Italian laborer was admitted complaining of abdominal pain and distention.

The patient was in good health until about 2 years before entry, when he noticed gradually increasing weakness, loss of appetite and during the ensuing year a decrease in weight from 165 to 130 pounds. After about 6 months he became dyspneic on moderate exertion and gradually developed edema of the lower extremities. A year ago his abdomen became progressively distended. Despite the accompanying weight increase, however, his arms, chest and face became thinner and the weakness increased. He entered a hospital where he remained for 6 weeks. During this period his abdomen was tapped once and a large amount of fluid removed. Thereafter he felt stronger and was discharged without ascites or edema. He was not able, however, to return to work. Four weeks after leaving the hospital both edema and ascites recurred to a greater extent than previously. Subsequently abdominal paracenteses were performed every 2 or 3 weeks by his physician. During the 5 months preceding his entry to this hospital he vomited about once or twice daily, usually after the ingestion of food. There was no hematemesis. About 4 months ago his vision became slightly blurred and progressed to the point where he was unable to read large print. A month before admission the dyspnea became so marked that talking became difficult. Micturition was scanty and during the 2 days before entry he voided only once and then a very small amount. His bowels were usually constipated but following each paracentesis he had three or four loose stools daily. This ceased as the fluid reaccumulated.

There were no previous illnesses of significance. The patient was accustomed to drink about two or three glasses of whiskey, wine or beer daily.

Physical examination showed a well-developed but thin, slightly dyspneic man with sallow, brownish, dry skin. The sclerae were clear and the mucous membranes slightly pallid. The

tongue was dry and atrophic at the tip. The breath was urinous. Examination of the fundi demonstrated many small fresh and old hemorrhages with patches of white exudate. Arterioles were narrow and tortuous and the discs pale. Small, firm, shotty nodes were palpable in the axillary, inguinal, and epitrochlear regions. The heart was not enlarged and the sounds were regular. The first sound in the apical region was split, afforded a double impulse and a systolic murmur was heard in the same area. The neck veins were not distended. The blood pressure was 160/100. The percussion note over both bases posteriorly and the lower portion of both sides of the chest anteriorly was dull to flat. Breath sounds in these regions were diminished to absent and tactile fremitus was markedly decreased. Over the left chest anteriorly between the second and fourth ribs and also between the sixth and seventh ribs a loud leathery friction rub was audible and palpable in the upright position but disappeared when the patient was recumbent. This rub had both cardiac and respiratory phases. The abdomen was markedly distended, the umbilicus protruded, and a fluid wave was elicited. There were numerous scars of paracenteses below the umbilicus. A firm sausage-shaped mass extended from beneath the left costal border for a distance of 5 fingerbreadths into the epigastrium. No note of its mobility was made and it did not seem to be connected with the spleen. There was generalized abdominal tenderness of slight degree, most marked in the left upper quadrant. Edema was present in the sacral region and in both lower extremities.

The temperature was 98° the pulse 96. The respirations were 30.

Examination of the urine showed a specific gravity of 1.012 with a large trace of albumin. The sediment contained frequent granular casts, 25 to 50 red blood cells and 4 to 8 white blood cells per high power field. The blood showed a red cell count of 2,300,000, with a hemoglobin of 55 per cent. The white cell count was 12,200, 89 per cent polymorphonuclears. Specimens of stool and vomitus gave negative reactions to the guaiac test. The nonprotein nitrogen of the blood was 120 milligrams. The serum protein was 6 per cent and a van den Bergh showed a normal indirect reaction.

A barium enema passed the ileocecal valve. There was considerable spasm in the sigmoid and in one small area in the transverse colon but no definite organic lesion was demonstrated. A gastrointestinal series did not show evidence of esophageal varices. The stomach was high in position and no peristaltic waves were observed on the lesser curvature throughout the examination. There was also rigidity of the

greater curvature near the lower pole of the stomach. No gross tumor defect was visible.

On the day preceding entry abdominal paracentesis produced 450 cubic centimeters of bloody fluid. Its specific gravity was 1.009 and there were 106 white blood cells per cubic millimeter, of which 85 per cent were polymorphonuclears. Twenty-two hundred cubic centimeters of bloody fluid was removed from the right chest 3 days later. The fluid had a specific gravity of 1.011 and contained 408 white blood cells per cubic millimeter. Of these 60 per cent were polymorphonuclears and no tumor cells were identified. An x-ray of the chest taken after the thoracentesis showed a high diaphragm on the left side. The right leaf was obscured by fluid occupying the lower two-thirds of the right lung field. The heart was transverse in position and there was poor aeration of the left lower lung field. The patient failed rapidly and died on the fourth hospital day.

#### NOTES ON THE HISTORY

DR CHESTER M. JONES: "The patient was in good health until about 2 years before entry, when he noticed gradually increasing weakness, loss of appetite, and during the ensuing year a decrease in weight from 165 to 130 pounds." A very striking loss of weight which must enter into the picture. Of course the most obvious cause of loss of weight of that degree, I should say, was malignancy and we have to consider that from the start.

"After about 6 months he became dyspneic on moderate exertion and gradually developed edema of the lower extremities." The way that is worded makes one wonder whether it may be due to anemia associated with a malignant process or possibly to cardiac failure, but if cardiac failure there has been no preceding story of heart disease. I am inclined to choose anemia as explaining the difficulty in breathing. With the anemia there may have been associated protein lack due to loss of appetite, and a nutritional edema.

Progressive distention of the abdomen has to be due to the formation of ascites, or to a solid mass. Gradual enlargement of the abdomen due to ascites together with gradual wasting which is obvious from the diaphragm up is characteristic of cirrhosis but also may be due to intra-abdominal malignancy with ascites.

"During this period his abdomen was tapped once and a large amount of fluid removed." I am sorry we do not know the character of the fluid obtained at that tap. It might help a little more toward diagnosis. We know then, that he had ascites and we know there are only a few causes for ascites. Cirrhosis and malignancy are the two most common causes, other possibilities are peritoneal irritation due to tu-

berculosis, and finally heart disease or Bright's disease. Heart disease and Bright's disease I think can be taken off the list for the moment.

Recurrent ascites in the absence of any more story than we have here could be due to cirrhosis perfectly well, or could be due to malignancy of an unusual type. Here is a story that goes back 2 years. It could be due to an adherent mediastinal pericarditis but that is such an unusual condition that I think it should be mentioned in passing and forgotten.

"During the 5 months preceding his entry to this hospital he vomited about once or twice daily, usually after the ingestion of food." This may have been due to disease of the stomach itself or to the fact that he has an abdomen full of ascitic fluid.

"About 4 months ago his vision became slightly blurred and progressed to the point where he was unable to read large print." I cannot see the significance of that unless we say he has nephritis. I do not think nephritis alone could possibly explain the picture. I suppose it is possible that he may have malignancy with metastases which has involved the eye, but that is guessing too far afield.

"Micturition was scanty and during the 2 days before entry he voided only once and then a very small amount." In other words, he is accumulating fluid in the tissue and the abdomen and possibly in the pleural cavities.

"His bowels were usually constipated but following each paracentesis he had three or four loose stools daily. This ceased as the fluid reaccumulated." I cannot explain that very curious statement. It is true that when you release the pressure in the abdomen by taking out a lot of ascitic fluid that you may get a change in bowel habit and in kidney function. When the fluid reaccumulates and displaces the abdominal contents one may get gastrointestinal disturbances in the nature of vomiting and constipation. The diarrhea may mean very marked edema of the bowel wall due to a protein deficiency. It may mean actual involvement of the small bowel by something like a lymphomatous process.

The dryness of the skin is due to dehydration. The dyspnea may be due to ascites and a high diaphragm or that plus anemia. I am wondering if he is any more brown than the average Italian we see. If there are areas of abnormal pigmentation that is worth considering, because with certain diseases we do get loss of weight, tendency to diarrhea, gastrointestinal disturbances, anemia and some of the symptoms he complains of, but we do not get ascites unless there is some additional complication.

"Arterioles were narrow and tortuous and the discs pale." That suggests that the arteriolar changes may be associated with a vascular neph-

ritis That will not explain, however, the whole picture

"Small, firm, shotty nodes were palpable in the axillary, inguinal, and epitrochlear regions" He has shotty nodes which are very small and barely palpable He was extremely undernourished and any glandular enlargement would be easily palpated I am inclined to think it is not of any significance

If his dyspnea is to be explained it is not to be explained on a cardiac basis alone he may have hypertensive heart disease with associated renal disease, but I do not think his heart is the cause of his trouble

I do not know what to think about a friction rub with change in position but undoubtedly there is some pleural involvement It may be due to inflammation or due to metastatic malignant disease There is no story of chest pain, so presumably it is not due to inflammatory process

"A firm sausage-shaped mass extended from beneath the left costal border for a distance of 5 fingerbreadths into the epigastrium" Wondering spleens are known to exist and it is possible that this is spleen but the note is made that the examiner thought it was not spleen, so I think we should respect his guess about it for the present at least It could perfectly well be stomach but that would mean a pretty abnormal thick-walled stomach I suppose it might have been omentum He has had a great many abdominal taps and certainly we frequently get a lot of thickening of the omentum and fibrous tissue reaction around it, with fixation of the abdominal wall after many paracenteses which sometimes cause abdominal masses Yet I cannot feel that the mass has anything to do with the story of frequent paracenteses I think probably we have something connected with the stomach wall That is only a guess

He is tremendously undernourished Undoubtedly he has edema which may be in part due to renal failure and which may be, to some extent, nutritional It may be due to massive ascites with some interference with the vena cava

From the physical examination I do not see how I can make a diagnosis He has a palpable mass and ascites He is undernourished with no mention of a palpable liver and spleen I do not believe that cirrhosis can be diagnosed from these findings I suppose that we have to consider malignancy as a possibility He probably has some renal involvement as well

The urine has a surprisingly low gravity for a person who was dehydrated It must mean renal damage He is not uremic simply because he lost fluid Certainly one would not have much hesitation in saying that there was nephritis present with that picture It is not the picture of infection of the kidney so far as I

can see With his hypertension and his age and his negative past history, if we can believe it, I should think it was fair to say he had vascular nephritis

"The white cell count was 12,200, 89 per cent polymorphonuclears" That could go with infection Apparently they are normal cells There is no suggestion of leukemia which would interest me as one possibility I think the slight elevation of white count and definite elevation of polymorphonuclears could go with an irritative process, or with malignancy, or with renal hemorrhage There is no obvious hemorrhage from the gastrointestinal tract

The nonprotein nitrogen fits in with a failing renal function, so that our laboratory studies give indication of renal involvement, but nephritis and Bright's disease as such do not give palpable masses in the abdomen unless associated with polycystic kidney In other words, that type of renal failure as a rule does not cause ascites and bilateral hydrothorax with recurrent ascites and the duration would be a very unusual finding simply to be explained on the basis of nephritis alone The fact that this man has a palpable mass makes the problem just so much more difficult I am inclined to think the renal involvement is an incident in the disease

"There was considerable spasm in the sigmoid and in one small area in the transverse colon but no definite organic lesion was demonstrated" That does not help very much and I should like to ask Dr Hampton whether that might not be true simply from the presence of ascites

No mention is made of the small bowel here He has no obvious malignancy of the small or large bowel by x-ray, nor has he any evidence of occult bleeding Therefore, if he has malignancy it is fair to look elsewhere than the gastrointestinal tract from the pylorus down

It would be interesting to know whether this mass which was palpated corresponded to the stomach which was seen I should think the description was consistent with a scirrhous carcinoma of the stomach which does not give gross deformity but involves the stomach wall It might be the picture of a lymphomatous involvement of the stomach If he has lymphoma it might cause involvement in other organs as well I should like to see the plates and have Dr Hampton comment on them I think they may be of real importance

The specific gravity of 1.009 of the abdominal fluid disturbs me a great deal, because it is an unusual thing for us to have a chest fluid or a peritoneal fluid with a gravity as low as that and have blood in it unless this fluid clotted and all we were dealing with was the serum

A lymphomatous process could give such a fluid with involvement of the peritoneum but

I am surprised that the gravity is so low. There may have been old blood in the abdomen from previous taps or from an irritative process involving the peritoneum and causing bloody fluid.

"Twenty-two hundred cubic centimeters of bloody fluid was removed from the right chest three days later." Again bloody fluid. That is a bit of a coincidence. It is more than a coincidence, I should say, we ought not to get bleeding from the belly and the chest, and it probably means a process involving the pleura and the peritoneum. I do not believe it is infectious in nature. It suggests the possibility of malignancy in some form. I suppose the diaphragm might have been pushed up by ascitic fluid, by a big spleen which was not palpable, or by this mass that went under the ribs and of which we were feeling only the lower portion. Another possibility is collapse of the left lower lobe raising the diaphragm on that side without any connection with the other findings.

"The right leaf was obscured by fluid occupying the lower two-thirds of the right lung field." In other words they had removed two liters but there was still a good deal of fluid there which obscured the picture.

#### DIFFERENTIAL DIAGNOSIS

I cannot give a very air-tight differential diagnosis because it is to me a very difficult case. I can do no more than say I think he has malignancy with involvement of the peritoneal cavity and of the pleural cavity. I do not know whether there is involvement of the kidneys or whether there is Bright's disease as an additional diagnosis, which makes the original diagnosis very much harder to establish. Hypernephroma, I suppose is a possibility, with metastases, but these are rather curious metastases for hypernephroma, if I remember correctly, and I am inclined to doubt that possibility. He is said to have a pigmented skin. I suppose hypernephroma or some tumor of that type might give pigmentation. He may be a swarthy Italian and the pigmentation may not mean anything. I do not think he has tuberculosis of the peritoneum or tuberculosis of the pleura with pigmentation or Addison's disease or anything as queer as that. I simply have to say he has malignant disease. I would like to know what Dr. Hampton says about the stomach. I think lymphoma has to be considered very seriously.

#### X-RAY INTERPRETATION

DR. AUBREY O. HAMPTON: I would like to agree that he has carcinomatosis but somehow I cannot quite locate it.

DR. JONES: Dr. Allen has made a good point. No mention is made of rectal examination.

There might well have been nodules felt by rectal examination which might help.

DR. HAMPTON: In this film taken after the tap you can see that the fluid shadow on the right side did not change much. It is surprising how much fluid you can take out of the chest without changing the x-ray appearance. I wish they could have removed a little more so that I could get a look at the lung root. The lung is collapsed on that side, the lower lobe at least, because the heart shifts toward that side even with the large quantity of fluid. That could be due to fluid accumulating over a long period of time, or disease of the bronchus. I do not know how I could differentiate it without taking the fluid out. The remainder of the lung is clear except for atelectasis. Here is a man with one lung to breathe with, with a high left diaphragm which is not a smooth curve as one would expect from pressure below but there is a rather sharp irregularity.

Barium enema shows spasm in the sigmoid. I do not see the spasm described in the transverse colon but this type of spasm is exactly what we see associated with diverticulitis or extrinsic disease around the sigmoid such as malignancy or infection. It is queer that malignancy produces exactly the same spasm as infection. The cecum is rather small but does not show any filling defect. The ascending colon is rather narrow there. I cannot see enough in the colon to make a diagnosis.

A PHYSICIAN: If he had intrinsic disease of the colon at this time it ought to be pretty obvious.

DR. HAMPTON: The splenic flexure is high. We cannot say he had a large spleen. He may have slight enlargement of the liver. It is not very obvious there. The diaphragm is so high that it might have gone up with it. The x-ray description of the stomach is that of carcinoma of the lesser curvature and here I am trying to prove it is not from these films, because I do not think it is. Certainly the lesser curvature is more irregular and appears stiffer than it should. The mucosal folds are thickened and you can see this shadow that could very well be something infiltrating the wall. They could not compress this fellow because his belly was so big and they could not see much with the fluoroscope because it was so dense, so I realize they did not have much chance. They did not say whether peristalsis was present in the upper portion of the stomach. You would have to say the lesser curvature was diseased either from without or within, either adherent to the liver or due to infiltration. This thing here attracted my attention when I first looked at it, especially since there was a mass there but I think you can explain that defect on the basis of the colon.



DR. JONES Then you do not think he had cancer of the stomach?

DR. HAMPTON I think he has carcinomatosis I do not know where it came from

DR. JONES Is there anything in the films to suggest carcinoma of the pancreas?

DR. HAMPTON I cannot point out the head or tail of the pancreas It would be a fairly good guess

#### CLINICAL DIAGNOSES

Chronic glomerulonephritis

Uremia

Carcinomatosis, ? primary (lung, stomach, pancreas)

#### DR. CHESTER M. JONES'S DIAGNOSES

Carcinomatosis

Chronic nephritis

#### ANATOMIC DIAGNOSES

Cirrhosis of the liver, toxic type

Subacute glomerulonephritis

Chronic fibrous peritonitis

Splenomegaly

Accessory spleens

Bilateral hydrothorax

Arteriosclerosis, slight

#### PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY I think this is one of those cases that become more difficult the more you find out about the patient. As I was originally told the story in very brief form I guessed the correct diagnosis on the basis of incorrect evidence. I assumed the mass in the left upper quadrant was spleen and on the basis of repeated taps and the large spleen I said he had cirrhosis, and on the basis of the very unusual urinary findings I said he had nephritis. That was correct but the reasoning was wrong because the mass was not spleen. The mass was an agglomeration of coils of small intestine, the peritoneal surfaces of which were between one and two millimeters thick from dense fibrous overgrowth. The same sort of keloid-like fibrous reaction of the peritoneum was present on the stomach as well and accounted unquestionably for its deformity. The surfaces of the liver and spleen were also involved.

The cirrhosis was a fairly marked and obviously long-standing process. The spleen was a little enlarged but not markedly so, 375 grams, about twice normal. The kidneys were just below normal in size, 270 grams, and showed a slight narrowing of the cortex. Microscopically they showed a very marked subacute glomerulonephritis which I should guess was of no more than six months' duration, just beginning to be chronic.

The case interested me as falling into the

category regarding which Dr. Jones's confreres, the gastroenterologists, have written a good deal, the hepatorenal syndrome. The syndrome has never impressed me greatly and I doubt very much if there is such a thing. One does see from time to time cases in which the liver and kidney both show involvement. That is true here but I think you can pretty safely say the liver lesion is years old whereas the kidney lesion is only a few months old. If the two were connected etiologically it would be reasonable to expect processes of approximately the same duration in both places. I think we are dealing here with an incidental nephritis complicating a mild long-standing cirrhosis and I would assume that the peritoneal reaction was due to the repeated tapping. There was nothing to explain why either the pleural or the belly taps were bloody except that they may have scratched a vein in each case.

#### CASE 22522

##### PRESENTATION OF CASE

A 63 year old American housewife was admitted complaining of pain in the abdomen.

For about a month prior to entry the patient had vague pain in the left lower portion of the back which became worse when she remained on her feet for any length of time. She ascribed this to an automobile accident which had occurred 2 years previously. On the morning of entry she arose as usual and while cooking breakfast first noted a sharp cramp-like pain in the right lower quadrant. She continued with her cooking, however, and following this ate her usual breakfast. She noted that sitting down relieved her abdominal discomfort but she continued to be up and about during the morning. She was impressed by the fact that sudden standing after being seated caused her pain to become acute. The usual light lunch was eaten and during the afternoon the patient felt well enough to do some ironing. At about 5:00 p. m. a physician was called and he advised hospitalization. The pain had become inconstant during the day but when present had been sharp and boring in character and apparently radiated toward the right hip. Sitting down caused it to lessen and become a sore dull ache. There was no nausea or vomiting and there were two normal bowel movements during the day. This was said not to be remarkable for the patient. There had been urinary frequency every 15 minutes since the onset.

The catamenia had terminated at 40 years but there had been some leukorrhea since that time. For 2 weeks prior to entry vaginal discharge had been somewhat more profuse and malodorous.

Physical examination showed a rather obese elderly woman living comfortably in bed. The

pupils were equal and active and the mouth and pharynx were not remarkable. The lungs were clear and the heart normal. The blood pressure was 135/80. The abdomen was symmetrically full and there was some tenderness generally although most marked in the right lower quadrant, in which region there was also definite spasm. Pressure in the left lower quadrant directed toward the midline produced pain in the right lower quadrant. No masses could be palpated. Peristaltic movements were active. Vaginal examination showed definite tenderness in the right vault but bimanual palpation was difficult because of lack of cooperation. The fundus was not discerned. The remainder of the examination was negative.

The temperature was 101°, the pulse 100. The respirations were 22.

Examination of the urine was negative. The blood showed a white cell count of 10,200.

Shortly after entry a laparotomy was performed.

#### DIFFERENTIAL DIAGNOSIS

DR RICHARD DWIGHT: About that pelvic examination, where you cannot feel a fundus it does not necessarily mean, to my way of thinking, that you are utterly vague about the fundus. With a woman of 63 years who has had the menopause twenty years before the fundus may be very small and atrophied and very difficult to feel even in a well relaxed and not very obese patient, but you can feel around enough to be reasonably sure it is not enlarged. On the other hand, with a very obese and uncooperative patient you may not be able to satisfy yourself whether it is enlarged or not if you do not feel it. In this case I cannot tell what the opinion of the examiner was but I am going to assume that the fundus was not enlarged.

The presenting symptom in this patient is pain. I do not know what kind of pain the patient was having. You must have some idea what kind of patient is having the pain. That makes it difficult on paper if you have no chance of summing up the patient. This patient was a little paradoxical in behavior. She had pain but it did not bother her enough to prevent her eating breakfast and lunch, and doing house work. Apparently she sat down at intervals for relief. On the other hand, it was severe enough to make her call in a doctor in the afternoon. Another thing is the intelligence of the patient, and the question of how accurately she can describe her pain. Is she a phlegmatic character who will not say she has a pain unless it is real pain or is she the kind of person who will call momentary discomfort pain? That is difficult to estimate. This patient did her usual work but when she got to the hospital she was either in such severe pain or so apprehensive

that she could not be cooperative in her physical examination. We have then, this patient with slight fever, slight leukocytosis, and the doctor who saw her estimated that her pain was sufficiently severe so that an emergency operation was called for. For that reason I shall assume that she had pretty bad pain in the pelvis even though she had only a slight white count and fever.

The location of her pain seems to be in the right quadrant. She mentions having had left-sided pain for about a month prior to entry. That pain was vague and bothered her only after moving around and doing a lot of work. I do not believe it has any connection with the present situation. The new pain on the right side was evidently much more severe. She first noticed it as radiating to her right hip and she herself gives us the thigh-psoas test which was not mentioned in the physical examination. She volunteers the information that with her thigh flexed she was more comfortable than when it was extended and also that when she extended her leg suddenly she experienced sharp pain. This would suggest that the pathology, whatever it is, is pretty well out on the right side and fairly well down in the pelvis and that it is motion of the iliopsoas muscle which is causing this discomfort. Another thing about the pain, she classed it as "cramp-like" pain. I think that is a rather difficult word to know the meaning of but there is no description of it which suggests that it is colicky pain. It does not seem to come and go. As I use the word it is not the same as colicky. The pain is definitely located in the right quadrant both by her symptoms and by physical examination. There is spasm in the lower quadrant, tenderness there. Pressure on the left also causes pain on the right and on pelvic examination there is tenderness on the right side.

We have a patient with this fairly severe pain in the pelvis, slightly elevated temperature and a white count very slightly elevated. What could cause it? She speaks of having had frequency so we might consider the urinary tract first. The urine is negative. I think that is sufficiently important to rule out the urinary tract in this case. If the pain was due to stones in the ureter we would expect red cells. There is no long history of any urinary trouble, so that I will rule out the urinary tract entirely. Now as to the genital organs, the only thing in the history that refers to them is this question of leukorrhea. I do not think that has anything to do with the case. Leukorrhea in a woman of that age is most likely due to a lacerated and infected cervix. It could be a simple vaginitis or a trichomonas vaginitis. If you assume that the leukorrhea has anything to do with the present illness you have to assume that it is more than something in the cervix,

and that there is a pyometrium. If you are assuming pyometrium and thinking of cancer of the fundus, it does not lead you very far into the right lower quadrant. If there is cancer that is causing leukorrhea I would also expect blood. For that reason I do not think the uterus itself is involved.

The patient fortunately is too old to have a ruptured follicle. She has passed the menopause by twenty years and is too old for an ectopic pregnancy, also too old for acute salpingitis. I think for a woman of that age an infected genital tract would be unusual. People of that age who do contract gonococcus infection have acute vaginitis much the same as children have before puberty. She might have a twisted pedicle cyst but the type of cyst that causes gangrene from twisted pedicle is almost always large enough to be felt. I do not think the very small cysts usually get a twisted pedicle. As there was nothing felt on physical examination no masses felt either abdominally or by pelvic examination. I am going to rule out twisted pedicle cyst. That leaves us the gastrointestinal tract to consider. It is possible to have a perforated ulcer and practically all the presenting symptoms in the pelvis, also with some urinary symptoms but if that were the cause I would expect that there would be some past history of indigestion or epigastric pain, with nausea and vomiting and it would be rather far fetched to suggest that in this case. Coming down lower in the gastrointestinal tract, in fact to the other end there is a question of diverticulitis. I think it would be quite possible to have a diverticulitis of the sigmoid that would have all this pain located down in the pelvis and possibly mainly on the right side, but fairly unlikely to have it on the right side with no tenderness or spasm or pain on the left. There is no history of interference with bowel evacuation and no history of obstruction or diarrhea. Carcinoma of the gastrointestinal tract is something you always have to consider, but again I do not see anything that leads to it.

If she had carcinoma of the cecum which perforated she might have symptoms very much like these in location and character but you would expect that she might have obstructive symptoms and certainly expect an anemia and for that reason I am not going to consider carcinoma. There is the possibility of regional ileitis and again I do not think it fits very well into the picture. So what we have left is the appendix. I see nothing in this picture that rules out the appendix, and while I would like

to have a little higher white count, at the same time it is possible that she could have acute appendicitis with a white count of 10,000, so I am going to make a diagnosis of acute pelvic appendicitis.

#### CLINICAL DISCUSSION

DR RALPH ADAMS. On opening the abdomen through two and a half inches of fat the cecum was found slightly displaced upward with a grossly normal appendix lying free at its base. Against the anterior abdominal wall in the right lower quadrant over the area of most marked spasm preoperatively, one lobule of a large cystic structure was found. This lobule was somewhat blue in appearance. Beneath that the main cystic mass lay. It was about 8 centimeters in its greatest diameter. The lowermost part was level with the rim of the pelvis and beneath the cyst itself in the pouch of Douglas were several coils of small intestine. The cyst was twisted on its pedicle one and a half times. There was thrombosis of the veins in the pedicle. The right cystic mass including the tube was removed and routine appendectomy done.

#### CLINICAL DIAGNOSES

Acute appendicitis  
Twisted ovarian cyst

DR RICHARD DWIGHT'S DIAGNOSIS

Acute appendicitis

#### PATHOLOGIC DIAGNOSES

Dermoid cyst of the ovary with some teratomatous elements  
Healed appendix

#### PATHOLOGIC DISCUSSION

DR TRACY B. MALLORY. The specimen which reached us was a fairly large cystic ovary obviously gangrenous from interference with the blood supply. When opened it proved to be filled with hair and cheesy material and down at one corner as there so often is in dermoid cysts there was a solid nubbins of tumor in which cartilage and various other teratomatous elements were discovered. The appendix was entirely negative histologically. Teratomas of the ovary ordinarily provoke symptoms at a very much earlier age period than was the case in this woman. You find them not uncommonly in children, frequently in young women and only rarely in elderly women past the menopause.

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## ADVANCES IN THE SPECIFIC TREAT- MENT OF PNEUMONIA

IN a recent issue of this *Journal* (Nov. 5, p. 890) the Pneumonia Committee of the Boston Health League called attention to the approaching season of increased prevalence of lobar pneumonia. The committee emphasized the importance of this disease and the usefulness of specific treatment, and also outlined the facilities available in Boston for rapid typing, for obtaining Types I and II antipneumococcic serum and for the nursing care of pneumonia patients.

These conveniences are not limited to Boston. There are now about seventy-five laboratories throughout Massachusetts prepared to do rapid sputum typing and to furnish serum for the treatment of early cases in which Type I and II pneumococci are found. Nursing service is also available on a visit basis in almost every part of this state. In many other states in New England and elsewhere, increasing numbers of laboratories in large and small communities are

equipped to do rapid sputum typing. The health authorities of a number of these states have made provisions for typing and will supply serum out of public funds, under certain specified conditions. Every physician will do well to acquaint himself with the particular facilities available in his own community.

The fullest benefit of specific serum treatment in pneumonia, namely, the marked reduction in mortality, the induction of an early crisis and probably the prevention of empyema, can be attained only when cases of the proper type are treated early. This means that the physician must make every effort to obtain an etiologic diagnosis in every patient *as soon as the diagnosis of pneumonia is suspected*. Practically, this means the typing of sputum from every patient presenting an abrupt onset of a febrile illness accompanied by chill, pleuritic pain, cough and blood-tinged or rust-colored sputum. Moreover, the regularity with which the finding of Type I or II pneumococci in the sputum of such cases is associated with the clinical picture of lobar pneumonia makes this procedure all the more valuable. To wait for the distinctive physical signs of pulmonary consolidation to become apparent, therefore, means the loss of valuable time. Repeated sputum examinations are desirable when the earlier samples are unsatisfactory or fail to yield a definite type.

The classification of the pneumococci formerly included in Group IV into the specific Types IV to XXXII, inclusive, has had a number of practical effects. It has made it possible to obtain a definite type diagnosis in those cases in which a doubt might otherwise exist when a pneumococcus could not be classified as Type I, II or III. It has enabled workers in some large clinics and others interested in the treatment of large numbers of pneumonia patients to ascertain the relative importance of the various types. This, in turn, has served as a guide for the further development of specific serums.

The practical results of this course of events are already becoming apparent. Bullock, at the Harlem Hospital, has obtained highly promising results in the treatment of cases due to at least four of the more frequent of these new types, namely, Types VII,<sup>1</sup> VIII<sup>2</sup> and XIV<sup>3</sup> and, more recently, Type V.<sup>4</sup> In this issue of the *Journal*, Finland and Tilghman have presented a series of carefully studied cases of Type V pneumonia treated with a specific antibody at the Boston City Hospital. The result of the therapy in this small group of cases appears to be very favorable and is comparable to the results in specifically treated Type I cases. The latter writers have also had similar experience with the treatment of cases of Type VII pneumococcus pneumonia.<sup>5</sup>

These results appear to be definite advances

in expanding the field of usefulness in the specific treatment of pneumonia. They further emphasize the importance of rapid typing. It may not be amiss to suggest that Types V and VII be included in routine typing practice and that certain cases due to these types be considered for serum treatment. Specific serums for Types V and VII are not supplied at present by the Massachusetts Department of Public Health. They are being furnished in some other communities under the same conditions as Type I or II serum and may be obtained from certain of the commercial manufacturers.

## REFERENCES

1. Bullowa J G M. Therapeutic value of specific Type VII (Cooper) antipneumococcal serum. *Libman Anniv Vols* 1 253 (Oct.) 1932
- \* Bullowa J G M. Therapeutic pneumococcus Type VIII (Cooper) serum. *J A. M. A.* 102 1560 (May 1.) 1934
3. Bullowa J G M. Pneumonia due to pneumococcus Type VII (Cooper) and its treatment with specific antiserum. *J Clin. Investigation* 14 373 (July) 1935
4. Bullowa J G M and Wilcox C. Therapeutic serum for pneumococcus Type V (Cooper) pneumonia. *J Clin. Investigation* 15:711 (Nov.) 1936
5. Finland M, Tilghman R, C. Rueggesser J M and Dowling H F. *Am J M. Sc.* (In press)

THE INCOMING EDITOR OF THE  
NEW ENGLAND JOURNAL OF MEDICINE

IN the conduct of any human enterprise changes are inevitable and the editorial management of *The New England Journal of Medicine* passes, with the last issue of 1936, to Dr Robert N Nye who has been appointed Editor of this *Journal* by the Committee on Publications of the Massachusetts Medical Society to succeed Dr Walter P Bowers who has occupied the position of Managing Editor since April, 1921.

The retiring Editor wishes to express his appreciation of the support given by the Committee on Publications, the cooperation of the *Journal* Staff and the Officers and Fellows of the Massachusetts Medical Society during these years.

The official association of the *Journal* with the Massachusetts Medical Society was inaugurated on June 10, 1914, when the Council of the Massachusetts Medical Society voted to enter into an affiliation with the *Journal*, then the *Boston Medical and Surgical Journal*, there by making the *Journal* its official organ. An Editorial Board was installed consisting of E W Taylor, Editor-in-Chief, with Robert M. Green his associate representing the owners of the *Journal*, and Walter L Burrage and Frederick T Lord representing the Massachusetts Medical Society. Cooperating with the Editorial Board, an Advisory Committee was created consisting of Edward C Streeter, Chairman, Walter P Bowers, Homer Gage, Joel E Goldthwait, Lyman A Jones, Hugh Williams, Alfred Worces-

ter and Robert B Osgood. This organization was continued with a few changes in the Editorial Staff and the Advisory Committee until April 21, 1921 when, after negotiations with the owners of the *Journal*, it was sold to the Massachusetts Medical Society and the Managing Editor was installed, with an Editorial Staff of nine doctors representing medical education in Boston. Additions have been made to the Staff from time to time, by the selection of physicians who are especially qualified to promote the value of the *Journal* to its readers.

The retiring Editor feels warranted in assuring the medical profession that the Staff will persist in its ambition to maintain a *Journal* of educational value and worthy of the respect of its sister publications.

Dr Nye, the incoming Editor, is a graduate of Harvard College and the Harvard University Medical School and served as intern at the Massachusetts General Hospital and later as Research Assistant of Dr F T Lord. His subsequent appointments have been Assistant Pathologist in the Pathological Laboratory of the Boston City Hospital, Assistant Director of the Antitoxin and Vaccine Laboratory of the Massachusetts Department of Public Health, Assistant and Associate at the Thorndike Memorial Laboratory of the Boston City Hospital, and for the past several years Assistant Pathologist in the Pathological Laboratory of the Boston City Hospital in charge of bacteriology.

In these several scientific fields Dr Nye has been in close association with research and clinical medicine and is especially interested in the application of scientific knowledge to the practice of medicine. It is a privilege to commend him to our subscribers.

CHANGES IN THE DEPARTMENT OF  
MENTAL DISEASES

THE nomination of Dr David L Williams to the position of Commissioner of Mental Diseases has been confirmed by the Council, and Dr John V Thuot has been appointed by Commissioner Williams to fill the position of Superintendent of the Boston State Hospital to supplant Dr James V May.

The Massachusetts Medical Society, through its officers, made certain recommendations to his Excellency respecting the qualifications of psychiatrists worthy of appointment to these positions but without suggesting the names of individuals. The purpose of the Society was to give assistance to the Governor if he wished for expert advice. These appointments were not made from practitioners eminent in institutional psychiatry so far as we have been able to learn.

## THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

LANDSTEINER, KARL Sc D, M D Medizinische Fakultät der Universität Wien 1891 Member of the Rockefeller Institute for Medical Research, New York City His subject is "Serological and Allergic Reactions with Simple Chemical Compounds" Page 1199 Address 66th Street and York Avenue, New York City

SHIGA, KIYOSHI M D Tokyo University Medical College S D Harvard Formerly, Professor, Keio University, Dean of the Medical Faculty, and President of the Keio Imperial University Now, Professor of Medicine, University of Tokyo Honorary Member of Kitasato Institute (for Infectious Diseases), Tokyo His subject is "The Trend of Prevention, Therapy and Epidemiology of Dysentery Since the Discovery of Its Causative Organism" Page 1205 Address University of Tokyo, Tokyo, Japan

FINLAND, MAXWELL B S, M D Harvard University Medical School 1926 Instructor and Francis Weld Peabody Fellow in Medicine, Harvard University Medical School Assistant Physician, Thorndike Memorial Laboratory, Boston City Hospital Address Thorndike Memorial Laboratory, Boston City Hospital, Boston, Mass Associated with him is

TILGHMAN, R CARMICHAEL A B, M D Johns Hopkins University School of Medicine 1932 Formerly, Research Fellow in Medicine, Harvard University Medical School Assistant Resident Physician, Thorndike Memorial Laboratory, Boston City Hospital Now Resident Physician, Johns Hopkins Hospital Instructor in Medicine, Johns Hopkins University School of Medicine Address Johns Hopkins Hospital Baltimore, Md Their subject is "Clinical and Immunologic Observations in Cases of Pneumococcus Type V Pneumonia Treated with Specific Antibody" Page 1211

KIMPTON, ARTHUR R M D Dartmouth Medical School 1905 F A C S Surgeon-in-Chief, First Surgical Service, Boston City Hospital Consulting Surgeon, Newton Hospital Address 23 Bay State Road, Boston, Mass Associated with him is

DALRYMPLE, SIDNEY C M D Bowdoin Medical School 1917 Diploma in Bacteriology London University 1935 Associate Professor of Pathology and Bacteriology, Tufts College Medical School Pathologist, Newton Hospital Address The Newton Hospital, Newton Lower Falls, Mass Their subject is "Aneurysm of an Intestinal Branch of the Superior Mesenteric Artery" Page 1221

SHEDDEN, WILLIAM M M D Harvard University Medical School 1920 F A C S Assistant in Anatomy, Harvard University Medical School Instructor in Surgery, Tufts College Medical School Chief of Tumor Clinic, New England Medical Center Assistant Surgeon to Outpatients, Massachusetts General Hospital His subject is "Lymphatic Metastasis in a Case of Rectal Adenocarcinoma Simulating a Clinically Benign Tumor" Page 1222 Address 270 Commonwealth Avenue, Boston, Mass

ARNOLD, J O M D Jefferson Medical College 1896 F A C S Professor of Obstetrics Temple University School of Medicine, Philadelphia, Pa His subject is "More Rational Methods in the Prevention and Control of Eclampsia" Page 1226 Address 4149 N Broad Street, Philadelphia, Pa

## MISCELLANY

LUNCHEON IN HONOR OF MISS EMILY P  
BISSELL

Tuberculosis Then and Now was the program theme of an honorary luncheon to Miss Emily P Bissell, founder of the tuberculosis Christmas Seal It took place Friday, December 11, at the Twentieth Century Club, Boston with Dr Frederick T Lord President of the Massachusetts Tuberculosis League, presiding

Tuberculosis Then' was presented by Dr Horace Paine Stevens, who told how his father Dr Edmund Horace Stevens, contracted tuberculosis and was cured in 1863 The elder Dr Stevens, aged 91 on January 2 next, sent regrets on his inability to attend

Dr Horace Stevens reported that Dr Henry I Bowditch successfully treated his father who had hemorrhages and fell in weight to 110 pounds The treatment was as follows

- 1 Life out of doors, and in the sunlight as much as possible
- 2 Walking daily up to four miles, if the patient could do it
- 3 Much sleep—early to bed and late to rise
- 4 Extra food with stress on milk and meat.

The old fashioned stethoscope with a cap on either end was used by Dr Bowditch It was not very different from the instrument then but recently invented by Laennec

As this was 19 years before Dr Robert Koch of Germany discovered the tubercle bacillus and wrote his paper Discovery and Cultivation of the Bacillus Tubercle there was no knowledge of the cause of the disease or of its communicability It was held that severe and frequent colds caused one to go into decline or to have consumption

During the Civil War Dr Stevens was wounded in a naval engagement at the Battle of Mobile Bay After his demobilization and his recovery he joined

the army but was soon out with the wars end He at once became a student at Harvard Medical School graduating in 1867 He has been a member of the Massachusetts Medical Society since 1868 In 1871 he settled in Cambridge where he has remained and practiced ever since The writer recently noted the sign of father and son on their joint Cambridge office

Dr Horace Stevens said that his grandfather also a medical practitioner and his father had come to believe in the communicability of tuberculosis through their experiences with families wiped out by the disease While Dr Bowditch was at first unfavorable to this idea he later held the disease to be communicable

Tuberculosis Now was presented by Dr Alton S Pope Director of the Division of Tuberculosis State Department of Public Health

It the 1900 death rate continued said Dr Pope the present tuberculosis deaths in Massachusetts would be 7 000 instead of 1 960

After showing that tuberculosis has been reduced approximately 75 per cent since 1900 falling from the first to the seventh place among causes of death he spoke of the accomplishment in sanatorium bed provision in Massachusetts which now has some 2½ tuberculosis beds per annual deaths He declared that artificial pneumothorax even though some are now holding to the contrary is definitely contributing to arrest in tuberculosis patients and that by stopping the spread of infection through sputum is helping to reduce the number of cases Dr Pope stated that we may look forward to a time when tuberculosis may be said to be under control Another authority has pointed out that control may be said to have arrived when the yearly mortality rate falls below 10 per 100 000 of the population.

When in 1904 the National Tuberculosis Association decided to do research and have applied the existing knowledge of tuberculosis it also undertook the task of spreading information to all of the public Without this the research would have been without ultimate value for after sanatoria clinics and public health nursing are provided there remains the necessity of securing the individuals own willingness to do his part

It is in this field said Dr Pope that the funds from the Christmas Seal founded by Miss Bissell are able to make a most important contribution to tuberculosis prevention

The guest of honor Miss Emily P Bissell, told how thirty years ago she founded the Christmas Seal to help finance a struggling tuberculosis hospital started by four physicians of Wilmington Delaware Though the need was large the patients could not pay for their care and only eight remained in the sanatorium Miss Bissell credited Einar Holboell a postal clerk of Copenhagen Denmark with starting the first tuberculosis Christmas Seal in the world in 1904 She learned of his idea through Jacob Riis who wrote about it in the *Outlook* That the Seal is and always was primarily an educational

device with the securing of financial income second in importance Miss Bissell stoutly contended. Yet this financial figure since 1907 brought in approximately eighty million dollars

The Christmas Seal message and the importance of tuberculosis and its preventability reached the legislators and they have acted. In Delaware the women who then backed the Christmas Seal Sale were Red Cross and Womens Clubs Several legislators reported that their wives refused to get them supper whenever they declined to vote for an appropriation for the Delaware Commission so it had \$15 000 yearly for many years until the State Board of Health was able to assume the duty and later to receive from the Delaware Tuberculosis Society its struggling sanatorium It has now been improved by the state beyond recognition

In closing Dr Lord stated that future methods of tuberculosis work were not considered. He believed however that the tuberculosis associations would find their chief field in improving and extending the health education work against tuberculosis and in cooperating with the various official agencies in an increasingly successful conduct of school chest clinics and the case-finding efforts that properly accompany it.

Unique at this luncheon was an exhibit of American and foreign Christmas Seals It backed Miss Bissell and extended for 80 feet along the wall filling the range of vision Besides the vote of congratulation passed for Dr Edmund Horace Stevens was one of thanks to Mr Preston C Pond of Chicopee for the loan of his international collection of Christmas Seals The exhibit gave the audience a feeling that tuberculosis is not only being vigorously attacked throughout our own state and nation but that the double-barred cross and the Christmas Seal are the world wide emblems of a winning world wide fight against tuberculosis.

#### AN EPIDEMIC OF SMALLPOX

Forty cases of smallpox in Danville New York have been reported by the local health officer with an extension of the epidemic to Hornell of five cases and to Ossian of two others

The usual precautions are being taken in general vaccination of the people of those towns Fortunately the disease has been mild and the epidemic seems to be under control.

#### MAINE NEWS

Since the first of March in accord with the act funds have been allocated to the Maine State Bureau of Health to expand and extend the work in Maternal and Child Health.

The extension of the service has called for a division of the work which has heretofore been carried on by the Division of Public Health and Nursing The Maternal and Child Health Program has been placed under supervision of a recent appointee to the State Bureau Herbert R Kobes MD

As plans for the enlarged program unfolded the State Director of Health requested the President and Councilors of the Maine Medical Association to appoint an advisory committee to consult with Dr Kobes on general policies. In addition to the four medical members of the Committee two dentists have been appointed, two public health nurses and a member of the State Bureau of Social Welfare. As the program expands a large committee with many members from the State Medical Association will be organized to help carry the benefits of the services into all parts of the State. Below are described by Dr Kobes in some detail the attitudes and plans of his department.

"Most of the field work will, of course, have to be carried on by public health nurses. But in no case is any nurse connected with the State Bureau of Health to carry on any work with a patient of a doctor unless that doctor is fully cognizant of what is being done. It would be well if in all cases this public health nurse could act as the private nurse of the physician. It must be remembered in this connection that public health nurses do public health nursing and not actual nursing of the sick. Their function, as is true of all public health bodies is educational and preventive in nature.

In conformity with the present custom prenatal infant, preschool and school nursing will be carried on by the public health nurses and an endeavor is being made for these nurses to cover the whole State. This program is well under way now because both the Maine Public Health Association and the American Red Cross are making plans by which their nurses and the State nurses will work together to carry out a well conceived program for the whole family.

The Medical Director of the Program feels that wherever possible health work with mothers and children should be carried on and directed by the family physician but that he should have some person to whom he may go in order that difficult problems may be answered for him. Thus the Director of the Program works in an advisory capacity. It is known that there are many people within the State who cannot afford to pay for a physician's services. This is true of therapeutic medical service and naturally is even more true of health services. The physician has been and always will be willing to carry on a certain amount of work without any thought of financial recompense but this type of work may take up too much of his time. In cases where people are unable to pay for medical services, the most economical method of taking care of these people must be considered. Knowing this the necessity for infant and preschool conferences is obvious. The present program makes it possible to include limited numbers of such conferences at which attempts will be made to have a local physician in attendance and for this service he is to be paid a nominal fee.

Certain sums have been set aside for postgraduate

work for the medical and dental professions. The Maine Dental Association through its advisory committee to the Maternal and Child Health Program is making arrangements for a course to be held early this fall at which a dental authority will take up problems connected with children's dentistry. Likewise, steps are being taken to develop a course which includes the fundamentals in obstetrics and pediatrics. It has been thought best that this course should be carried on by men practicing within the State—who are especially qualified in these two fields, Roland B. Moore, M.D. of Portland, and Magnus Ridlon, M.D. of Bangor with their associates will conduct the obstetric sessions and Thomas A. Foster, M.D., of Portland, and Clair Bauman, M.D. of Waterville and their associates, will conduct the pediatric sessions. These courses are to be given in rural areas, because the program as a whole is one for these areas. It will be possible for the rural practitioner to attend the postgraduate courses near his home. Arrangements for the course will be made through the various county medical societies who will sponsor the courses. They will be assisted, so far as expenses are concerned, by the Division of Child Hygiene.

In addition to the services described by Dr Kobes medical consultation is offered by him. For families unable to meet the expense of a consultation for their child, Dr Kobes will be prepared to give his services at the bedside, over the telephone or through the mail.

A most excellent program was presented during the two days. It represented a vast amount of work, hard work and planning by those responsible, and to the profession as a whole we owe and give deserved thanks. To us these important sessions demonstrate a fact worth notice. Maine is essentially a rural state. Large medical centers do not exist and the men conducting these clinics are not primarily teachers, they are men who earn their bread and butter by the daily practice of medicine. What they do, and how, is decidedly well worth knowing and anyone who failed to benefit at the last session is unfortunate to say the least.

To the credit of the Waterville group, several of the younger men were given places on the program. They did their work most creditably and showed a development of that most needful of all things, clinical sense and judgment. It was also very evident that the men in attendance appreciated the various clinics as was shown by the worth while keen discussion and questions. The clinics showed that the men giving them realized the fact that they were to talk to others doing the same things. Their ideas were put over clearly and were to the point.

#### CANCER CLINICS

The *Journal* is pleased to announce that four hospitals. The Maine General at Portland. The Central Maine General at Lewiston. The Eastern Maine General at Bangor and the Thayer Hospital at Water



ville, have established active cancer clinics. This is an extremely important move in the right direction and deserves and should have the hearty support of the profession.

Sponsored and advocated by the Maine Medical Association, these clinics offer the practitioner the services of the staff to establish the diagnosis and to institute the indicated treatment at the desire of the referring physician. As we stand today we know that certain types of malignancy in certain organs or tissues are best treated by radical surgery. It would seem that almost the ultimatum had been reached so far as operative removal is concerned but there are types of malignancy situated in certain organs and locations that are seemingly with our present knowledge, best treated by radium or deep x-ray therapy.

The responsibility of the general practitioner in establishing the diagnosis of malignancy is great. It is not expected that he will be asked to make technical examinations far beyond his ability and equipment but he can and should in suspicious cases avail himself of every possible aid. That is the main object of the cancer clinics. It is to help physicians in their daily work to establish the diagnosis early so that proper measures so far as we know them can be put into effect. The clinics will be staffed by a surgeon, internist, pathologist and radiologist. With the spirit always shown by medicine to those unable to assume the financial burdens the clinics offer this valuable service. The family or attending physician is urged to come with his patient. What he knows may be and often is of great help. The consultation will not be so complete as it should without him and the disposition of the given case will be as he elects.

The surgeon of experience knows today the chances of cure if the term be permissible of malignancy of some organs and at certain stages. We do not as yet know the full value of radium or deep x-ray therapy in others but as the various types are grouped and treated an honest evaluation of the end results can be helpful. What not to attempt is sometimes valuable to know. Clinics are powerless unless the work is supported by the profession as a whole. The fight properly begins with the family physician—as a rule he sees the case early and he must beyond a reasonable doubt, prove the suspicious case one way or the other. If he does then many many times the end result is a happy one.

Diagnostic and consultation clinics for cancer will be held at the following hospitals on the day and at the hour mentioned:

Maine General Portland Surgical Director William Holt M.D. Thursday 11 a.m. 12 m.

Central Maine General Lewiston Surgical Director Joseph Scannell M.D. Tuesday 11 a.m. 12 m.

Eastern Maine General Bangor Surgical Director Magnus Ridlon M.D. Thursday 11 a.m. 12 m.

Thayer Waterville Surgical Director Edward H. Rislev M.D. Thursday 9 11 a.m.

#### THE PHARMACOPOEIAL HEARING

As widely announced the members of the Executive Committee of Revision of the Pharmacopoeia held a hearing and conference in Washington on November 30 and December 1. The titles under review for possible revision and republication in the First USP Annual Supplement, to appear on January 1 1937, had been announced some weeks before. These were widely published in the pharmaceutical press and sent by direct mail to all who expressed an interest.

In the meantime the Sub-Committees had studied the proposed modifications and submitted a number of recommendations. These were embodied in page proof which was distributed about ten days before the hearing. This page proof became the subject of first consideration at the hearing and each monograph was specifically discussed.

The success of the plan is assured by the great interest and large attendance and the splendid spirit of cooperation. The members of the USP Committee on Revision entered freely into the discussions describing many experiments and the results of their investigations. The discussions were stenographically reported and will be made available to all members of the Committee on Revision and those who were present.

There were three public sessions continuing until late on the evening of November 30. On Tuesday, December 1, the members of the Executive Committee of Revision met with the officials of the Food and Drug Administration and informally discussed the proposed revision of USP monographs. In the afternoon the members of the Committee of Revision reassembled and in the light of all facts made available by previous studies and conferences, decided on practically all changes to be submitted to the General Committee of Revision for approval and for publication in the First Annual Supplement to the Pharmacopoeia.

This Supplement will be well printed and bound in pamphlet form having the general appearance of the Pharmacopoeia. This pamphlet of approximately 100 pages will be available only in a substantial spring binder the binder being available subsequently for future reprints.

No price has yet been fixed for the Supplement and binder but it is expected that this will be maintained at approximately the cost of preparation.

E. FULLERTON COOK

Chairman of the U. S. P. Committee of Revision

## CORRESPONDENCE

## TEACHING PSYCHIATRY TO HOUSE OFFICERS\*

Dear Mr. Editor,

Today it is very generally acknowledged that in the treatment of many patients, more is accomplished from the recognition and proper management of their mental conflicts than from the diagnosis and treatment of their somatic disturbances not infrequently in our patients no organic disease is primarily responsible for their complaints. To put it another way, mind plays a large part in the mechanism of illness. All of this calls for a better knowledge of psychiatry on the part of practitioners than most of them have.

How to correct this situation is an important pedagogic problem of today. Better teaching of psychiatry is now being given in our medical schools, but this is not enough.

With a realization that patients at the Peter Bent Brigham Hospital would be better treated if those primarily responsible for their care knew more of the fundamental principles of psychiatry, I sought a means to that end. It was obvious to me that these house officers should have an opportunity to see and follow the management of mental patients in an institution planned for that purpose. How could this be brought about at no cost to the Peter Bent Brigham Hospital?

I first took this problem to Dr. James V. May, Commissioner of Mental Diseases of the Commonwealth and later to Dr. Winfred Overholser, his successor. Both were willing, actually eager to cooperate, with the result that they offered to my medical house officers at the Peter Bent Brigham Hospital the opportunity of residence and practical instruction for 4 months in Massachusetts State Hospitals. I incorporated in my medical service of 16 months, an additional period of 4 months to be spent at one of these State Hospitals, the period following a 4 months' experience in clinical laboratory work and preceding clinical service at the Peter Bent Brigham Hospital.

Now this plan has been in operation for a year, two men going to the Boston State Hospital and one to the Worcester State Hospital for each period. What is the result? A noticeable increase in interest in the mental conflicts of our patients and a greatly bettered method of handling their psychiatric problems. It has proved definitely worth while to Brigham patients and I am sure it will be a continuous help to these house officers in their subsequent practice of medicine. The officers of these institutions have been enthusiastically concerned to see that these house officers learn as much as possible of psychiatry in the available time.

This plan is a practical means of meeting another deficiency in our scheme of educating men to practice a better medicine. Undoubtedly in the long run this plan too will bring a recompense to state hospitals for mental diseases in developing practitioners

ready to be more cooperative in meeting the enormous problem of the best possible care of patients afflicted with serious mental diseases.

HENRY A. CHRISTIAN, *Physician-in-Chief,*  
Peter Bent Brigham Hospital, Boston, Mass.

## OFFICIAL ACTIONS OF THE BOARD OF REGISTRATION IN MEDICINE

State House, Boston

December 11, 1936

Editor, *New England Journal of Medicine,*

This is to inform you that at the meeting of the Board of Registration in Medicine held December 10, 1936, it was

Voted To restore the license of Dr. Julius Salpe, 218 Highland Avenue, Somerville, Massachusetts.

Voted To revoke the registration of Dr. Henry Daniels of Brockton, and to cancel his certificate of registration for the practice of medicine in the Commonwealth of Massachusetts because of court conviction on a charge of abortion.

Voted To revoke the registration of Dr. Barney Edward Sachs of Worcester as a practitioner of medicine in this Commonwealth and to cancel his certificate of registration, because of acting as principal or assistant in the carrying on of the practice of medicine with an unlicensed person.

Voted To suspend for six months the registration of Dr. Arthur E. Brides of Stoughton, because of gross misconduct in the practice of his profession.

Yours very truly,

STEPHEN RUSHMORE, M.D., *Secretary*

## A CORRECTION OF FIGURES IN THE 1935 REPORT OF THE BOARD OF REGISTRATION IN MEDICINE

Board of Registration in Medicine  
State House, Boston

December 14, 1936

Editor, *New England Journal of Medicine,*

The Annual Report of the Board of Registration in Medicine for the year ending November 30, 1935 on page five has a statement that the average rating on first examination of the fifty-four candidates who were graduates of Tufts College Medical School was 69. On page six is the statement that of sixty candidates who were graduates of Tufts College Medical School 45 passed, 15 failed, giving a percentage of 25 for rejected candidates.

Although these tables are not quite comparable, a discrepancy is apparent and the marks were rechecked and the computation done a second time. Apparently in transferring the marks from one paper to another, a mistake occurred and the figures on page five for Tufts College Medical School should read that the average rating of the fifty-four can-

\*A letter to the Editor of the American Medical Association, J. A. M. A. 107:1-969 (Dec. 1) 1936.

didates who took the examination for the first time was 76

Will you be kind enough to publish this letter as an appaent injustice has been done to the school

Yours very truly

STEPHEN RUSHMORE, M.D. *Secretary*

ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

535 North Dearborn Street Chicago Illinois

December 27 1936

*The New England Journal of Medicine*

In addition to the articles enumerated in our letter of November 3 the following have been accepted

Abbott Laboratories

Sterile Ampoules Procaine Hydrochloride Cistals for Spinal Anesthesia 50 mg

Lederle Laboratories

Tablets Digitalis Whole Leaf—Lederle  $\frac{3}{4}$  grain

Tablets Digitalis Whole Leaf—Lederle 1  $\frac{1}{2}$  grains

Tablets Digitalis Whole Leaf—Lederle 3 grains

McKesson & Robbins Inc

McKesson's Halibut Liver Oil with Vitamin D Concentrate in Neutral Oil Capsules 3 minims

McKesson's Halibut Liver Oil Plain 1 cc

McKesson's Halibut Liver Oil Plain Capsules 3 minims

Sharp & Dohme Inc

Scarlet Fever Streptococcus Toxin for Immunizing—Mulford

Scarlet Fever Streptococcus Toxin for the Dick Test—Mulford

The following product has been accepted for inclusion in the List of Articles and Brands Accepted by the Council But Not Described in N N R (New and Nonofficial Remedies 1936 p 471)

Belle Alkali Co

Dichloromethane Solvent

Yours sincerely

PAUL NICHOLAS LEECH *Secretary*

A PREFACE TO NERVOUS DISEASE

December 11 1936

Editor *New England Journal of Medicine*

A worker in another limited field has been reading *A Preface to Nervous Disease* by Dr Stanley Cobb a small book of some one hundred and seventy pages interspersed with clear diagrams and helpful charts This worker wishes to report pleasure in the reading and to acknowledge a remaining sense of obligation for new knowledge acquired which should enable him to serve his patients better

The diction of the book is delightful Again and again a technical passage is followed by a graphic summary almost novelesque in style which dissipates possible fatigue and stimulates new concentration. For example in speaking of the underlying

segmentation of the brain stem I olfactory, II optic III and IV oculomotor V biting VI VII and VIII sentinel IX X XI and XII nutritional he fancies a predatory animal in search of game First the trail is picked up by the olfactory sense (I) after following perhaps for hours the game is viewed (II) and the chase starts in earnest At close quarters the dodging and quick movements of the prey can only be followed by quick movements of the eye balls (III IV) At last the prey is in reach and with a swift bite (V motor) guided by the special whiskers or vibrissae about the mouth (V sensory) the quarry is seized and so forth. Again in Chapter VI dealing with the cerebral circulation in describing ill-defined intercellular fluid spaces about capillaries and nerve cells he says, Fluid moves through it but meets a certain amount of resistance like water flowing through heavy swamp vegetation, not running like a brook A striking visualization

The author's great familiarity with neurologic literature and research old and new is evident There is a vast amount of well presented information which will make it possible for general practitioners and specialists in other fields to detect neurologic symptoms and signs more easily and to interpret their significance more reliably

We have the strong impression that there is much original thought in these pages although this originality is disguised rather than proclaimed Wide circulation should be the fate of the book and we are sure that thanks to the author for his effort will be general and genuine

R B O

RECENT DEATHS

**CRAWFORD**—LAWRENCE PEARLS CRAWFORD M.D. of 75 Elm Avenue Wollaston died at the Faulkner Hospital Jamaica Plain December 12 1936 He was born in 1875 graduated from The Rush Medical College Chicago in 1904 and had practiced in Wollaston for the past 19 years

Dr Crawford was a Fellow of the Massachusetts Medical Society (having joined in 1918) and the American Medical Association

He is survived by his widow Mrs Dorothy Crawford a daughter Miss Mary E Crawford a student in Wellesley College and three sons Eugene and William Crawford of Chicago and John a student at Thayer Academy

**BRINDISI**—ROCCO BRINDISI M.D. with an office at 149 Richmond Street Boston died suddenly December 14 1936, aged 76 years Dr Brindisi graduated from the University of Naples and practiced for a time in Italy before coming to Boston In addition to an active practice among the Italian people he served as Italian consul until 1902

He joined the Massachusetts Medical Society in 1906 He was a Knight and Officer of the Crown of Italy chairman of the Roman Legion of America during the World War president of the Societa Dante Alighieri and had served the United States

## CORRESPONDENCE

## TEACHING PSYCHIATRY TO HOUSE OFFICERS\*

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How to correct this situation is an important pedagogic problem of today. Better teaching of psychiatry is now being given in our medical schools, but this is not enough.

With a realization that patients at the Peter Bent Brigham Hospital would be better treated if those primarily responsible for their care knew more of the fundamental principles of psychiatry I sought a means to that end. It was obvious to me that these house officers should have an opportunity to see and follow the management of mental patients in an institution planned for that purpose. How could this be brought about at no cost to the Peter Bent Brigham Hospital?

I first took this problem to Dr. James V. May, Commissioner of Mental Diseases of the Commonwealth and later to Dr. Winfred Overholser, his successor. Both were willing, actually eager to cooperate with the result that they offered to my medical house officers at the Peter Bent Brigham Hospital the opportunity of residence and practical instruction for 4 months in Massachusetts State Hospitals. I incorporated in my medical service of 16 months, an additional period of 4 months to be spent at one of these State Hospitals, the period following a 4 months experience in clinical laboratory work and preceding clinical service at the Peter Bent Brigham Hospital.

Now this plan has been in operation for a year, two men going to the Boston State Hospital and one to the Worcester State Hospital for each period. What is the result? A noticeable increase in interest in the mental conflicts of our patients and a greatly bettered method of handling their psychiatric problems. It has proved definitely worth while to Brigham patients and I am sure it will be a continuous help to these house officers in their subsequent practice of medicine. The officers of these institutions have been enthusiastically concerned to see that these house officers learn as much as possible of psychiatry in the available time.

This plan is a practical means of meeting another deficiency in our scheme of educating men to practice a better medicine. Undoubtedly in the long run this plan too will bring a recompense to state hospitals for mental diseases in developing practitioners

ready to be more cooperative in meeting the enormous problem of the best possible care of patients afflicted with serious mental diseases.

HENRY A. CHRISTIAN, *Physician in Chief,*  
Peter Bent Brigham Hospital, Boston, Mass.

## OFFICIAL ACTIONS OF THE BOARD OF REGISTRATION IN MEDICINE

State House, Boston

December 11, 1936

Editor, *New England Journal of Medicine,*

This is to inform you that at the meeting of the Board of Registration in Medicine held December 10, 1936, it was

Voted To restore the license of Dr. Julius Salpe, 218 Highland Avenue, Somerville, Massachusetts.

Voted To revoke the registration of Dr. Henry Daniels of Brockton and to cancel his certificate of registration for the practice of medicine in the Commonwealth of Massachusetts because of court conviction on a charge of abortion.

Voted To revoke the registration of Dr. Barney Edward Sachs of Worcester as a practitioner of medicine in this Commonwealth, and to cancel his certificate of registration, because of acting as principal or assistant in the carrying on of the practice of medicine with an unlicensed person.

Voted To suspend for six months the registration of Dr. Arthur E. Bides of Stoughton, because of gross misconduct in the practice of his profession.

Yours very truly,

STEPHEN RUSHMORE, M.D., *Secretary*

## A CORRECTION OF FIGURES IN THE 1935 REPORT OF THE BOARD OF REGISTRATION IN MEDICINE

Board of Registration in Medicine  
State House, Boston

December 14, 1936

Editor, *New England Journal of Medicine,*

The Annual Report of the Board of Registration in Medicine for the year ending November 30, 1935, on page five has a statement that the average rating on first examination of the fifty-four candidates who were graduates of Tufts College Medical School was 69. On page six is the statement that of sixty candidates who were graduates of Tufts College Medical School 45 passed, 15 failed, giving a percentage of 25 for rejected candidates.

Although these tables are not quite comparable, a discrepancy is apparent and the marks were rechecked and the computation done a second time. Apparently in transferring the marks from one paper to another, a mistake occurred and the figures on page five for Tufts College Medical School should read that the average rating of the fifty-four can-

\* Letter to the Editor of the American Medical Association  
J. A. M. 107:669 (Dec. 19) 1936

The most constant changes in the electrocardiogram after nitroglycerine were obtained in the chest lead in which in all but one case Q increased in amplitude by 10 per cent to 70 per cent and in all but two T decreased by 5 per cent to 26 per cent.

Dr Edward A. Edwards discussed The Effect of Thrombophlebitis on the Venous Valve. The organization and subsequent recanalization of a complete thrombus produce a disruption of the venous valve. This thesis was investigated by following the histologic changes in artificially induced phlebitis in the dog and spontaneous phlebitis in the human being. It was found that the cusp may become incorporated into the new thickened intima. If it happens to lie in the center of the lumen at the moment of thrombosis it undergoes complete or almost complete disruption. In either case the process finally produces a valveless vein.

Parietal thrombosis may similarly incorporate the cusp into the intima or it may fill the sinus with connective tissue and thicken and shorten the cusp proper. Thus there is produced true stenosis and insufficiency.

When the thrombosed vein does not recanalize its collaterals dilate. The valves of such collaterals are rendered incompetent by the dilation. In some situations, as in the inferior vena cava, this insufficiency allows the necessary reversal of the blood stream in the collateral veins.

It was felt that these studies revealed one of the causes for poor venous circulation after phlebitis.

A symposium on The Relation of the Nutritional Deficiencies to the Cardiovascular System was then presented. The first paper of this group was by Dr James M. Faulkner who spoke on Vitamin C and Rheumatic Fever. He referred to the work of Rinehart who had suggested an etiologic relationship between hypovitaminosis C and rheumatic fever. Other workers had not found vitamin C of any specific therapeutic value in rheumatic fever. On the other hand there was abundant evidence in the literature that infectious diseases in general are a very important precipitating cause of scurvy. It had been suggested by some previous observations of Dr Faulkner that rheumatic fever was no exception to the rule that infections throw a strain on the vitamin C metabolism. The development of methods of titrating ascorbic acid (vitamin C) directly in the blood serum and urine made it possible to attack this problem in a quantitative way. A comparison was made of the serum ascorbic acid levels in normal individuals in scurvy and in the presence of various infections. It was found that in scurvy the serum ascorbic acid is much reduced averaging about one third that found in normal individuals. In the presence of infection it was found that the serum ascorbic acid was also much reduced averaging about one-half that found in normal persons. Patients with rheumatic fever showed a depression of the serum ascorbic acid level of similar magnitude to other infections. Balance studies were made in cases with infection in which known amounts of ascorbic acid were given in the diet while

the serum levels and urinary output were followed. These studies indicated that in the presence of infection the intake of ascorbic acid necessary to raise the serum level and urinary output to normal is far greater than in normal individuals. The conclusion was that vitamin C does not play a specific role in the etiology of rheumatic fever but that rheumatic fever may like many other infectious diseases deplete the stores of vitamin C in the body.

Dr Robert W. Wilkins spoke on the Clinical Features and Characteristics of the Heart and Circulation in Nutritional Deficiencies. Dr Wilkins found that in patients with vitamin B deficiency diseases such as alcoholic polyneuritis or pellagra disturbances of the cardiovascular system are often found which cannot be accounted for on the basis of the etiologic factors commonly accepted as capable of producing circulatory failure. These disturbances are similar to those reported in beriberi and it was postulated are due to vitamin B deficiency.

Clinical symptoms and signs of heart failure often appear suddenly in patients deficient in vitamin B. Palpitation and dyspnea especially on exertion dependent edema, engorged veins, orthopnea or paroxysmal dyspnea may cause the patient to enter the hospital. On physical examination the heart may be slightly or moderately enlarged and there is tachycardia, embryocardia and gallop rhythm. There is a prominent precordial and epigastric pulsation. Systolic and rarely, diastolic murmurs may be heard. The electrocardiogram usually shows abnormal T waves and prolonged Q-T interval. There is a general peripheral vasodilatation with flushed skin and warm extremities. The systolic blood pressure is normal or slightly elevated, and the pulse pressure is often increased. "Pistol shot" sounds may be heard over the large arteries. The circulation time is decreased and the A-V oxygen difference is small. The venous pressure is usually elevated and there may be marked peripheral edema. There is danger of sudden collapse and death.

With treatment by vitamin B ( $B_{12}$ ) these derangements of the cardiovascular system revert to normal sometimes quickly in which case they may swing at first to subnormal or slowly even in spite of intensive treatment. Whether the return is quick or slow may depend on the severity of the structural changes before treatment or on the deficiency in some cases or more than one specific substance.

Dr Florence Haynes presented an electrocardiographic study of the heart in the vitamin B deficient rats. Eighteen rats were placed on a diet consisting of Wesson salt mixture 35 per cent, cornstarch 55.0 per cent, butter fat 8.5 per cent, washed casein 18.0 per cent and bakers yeast 15.0 per cent. The yeast was treated vigorously by autoclaving at a pH of 9 so that  $B_{12}$  and possibly some other B factors were destroyed. Standardized electrocardiograms were taken on the extremities by means of skin electrodes of copper wire. Vitamin B deficiency in the rat is characterized by a gradual decrease in food intake and body weight and of fall in heart rate from 500 to about 350 beats per minute. In four

federal education board and was responsible for the formation of evening classes for teaching the Italian language

His widow, Mrs Sophia (Buonamici) Brindisi, survives him

**PERRY**—**CHAUNCEY VALENTINE PERRY**, M.D., of Greenfield Massachusetts, was found dead in his room at the Weldon Hotel, December 8, 1936 Dr Perry was born in 1900, graduated from the Massachusetts State College in 1924 and from the Harvard Medical School in 1928 He had served an internship at the Boston City Hospital and the Boston Lying in Hospital, and, after settling in Greenfield in 1931, was retained by several insurance companies as medical examiner and carried on an active general practice

Dr Perry had served as town physician for one year He was a Fellow of the Massachusetts Medical Society and the American Medical Association

Two brothers, Nelson Perry of Waltham and John Perry of Manchester, Vermont survive him, as does a sister Mrs Margaret Stone who lives in Colorado

## NOTICES

### THE DIRECTORY OF THE MASSACHUSETTS MEDICAL SOCIETY

This publication is being compiled with all available information up to January 1, 1937 The material will be in the hands of the printer immediately after the first of the year and the copies will be distributed as soon as possible

### CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS, UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

Clinic	Date	Orthopedic Consultant
Haverhill	January 6, 1937	Dr Arthur T Legg
Brockton	January 14, 1937	Dr George W Van Gorder
Salem	January 4 1937	Dr Harold C Bean
Gardner	January 12, 1937	Dr Mark H. Rogers
Greenfield	January 8, 1937	Dr Harry R. Wheat
Pittsfield	January 18 1937	Dr Francis A. Slowick
Springfield	January 20, 1937	Dr Garry deN Hough Jr
Worcester	January 15, 1937	Dr John W O Meara
Lowell	January 30 1937	Dr W Russell MacAuland
Hyannis	January 26, 1937	Dr Paul Morton
Fall River	December 28 1936	January 25 1937— Dr Eugene McCarthy

### ILLUSTRATED LECTURE AT THE ROBERT B BRIGHAM HOSPITAL

Dr Sumner M Roberts and Dr Robert J Joplin will give an illustrated lecture on Arthroplasty of the Elbow Wednesday January 20 at 8 o'clock at the Robert B Brigham Hospital The operative tech-

nic on nineteen postoperative cases will be shown Physicians and medical students are cordially invited

## ANNOUNCEMENT

**ALBERT EDWARD SLOANE**, M.D., announces the opening of an office at 416 Marlborough Street, Boston. Telephone Kenmore 4140

## REPORTS AND NOTICE OF MEETINGS

### THE NEW ENGLAND HEART ASSOCIATION

The monthly clinical meeting of the New England Heart Association was held at the Boston City Hospital on December 14 Dr Soma Weiss presided

Dr Weiss opened the meeting with a demonstration of pathologic specimens An instance of adhesive pericarditis was shown with Aschoff bodies in the myocardium but with competent valves The patient had suffered from rheumatic fever and died following the first attack Another specimen showing rheumatic involvement of all the cardiac valves was presented The patient had had repeated attacks of rheumatic fever since the age of 17, and died at the age of 30 A specimen of coarctation of the aorta from a six months old fetus was demonstrated Two specimens with perforated hearts from a solitary abscess were described In one instance *Staphylococcus aureus* and in the other pneumococcus were the responsible factors In both instances death occurred suddenly and rather unexpectedly A case of subaortic stenosis with systolic thrill and murmur over the aortic area in a patient who died from pneumonia was shown In another patient a similar condition existed but was complicated by subacute bacterial endocarditis which involved the subaortic stenotic area as well as the area below the pulmonary valve, that was considerably narrowed

Dr James G M Hamilton spoke on circulatory effects of nitroglycerine Sixteen blood pressure and pulse rate observations were made on five subjects without cardiovascular disease and five patients with coronary sclerosis in the recumbent or semi-recumbent position before and after the administration of nitroglycerine in doses varying from 0.33 to 5.2 mg with an average of 1.75 mg Systolic pressure fell on the average 8.8 mm Hg Diastolic pressure showed variable changes from slight increases in four cases to slight decreases in nine no change occurring in three Pulse rate increased on the average 14 beats per minute These changes were considered to be less than might have been expected from the supposed pharmacologic action of the drug A comparison was made between the untoward effects of nitroglycerine one example of which was reported and the artificial syncope induced after sodium nitrite It was suggested that the reason for the former might be as in the latter a venous pooling dependent on an upright or semierect posture and resulting in diminished venous return to the heart and cerebral ischemia

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Clinical symptoms and signs of heart failure often appear suddenly in patients deficient in vitamin B. Palpitation and dyspnea, especially on exertion dependent edema, engorged veins, orthopnea or paroxysmal dyspnea may cause the patient to enter the hospital. On physical examination the heart may be slightly or moderately enlarged and there is tachycardia, embryocardia and gallop rhythm. There is a prominent precordial and epigastric pulsation. Systolic and rarely diastolic murmurs may be heard. The electrocardiogram usually shows abnormal T waves and prolonged Q-T interval. There is a general peripheral vasodilatation with flushed skin and warm extremities. The systolic blood pressure is normal or slightly elevated and the pulse pressure is often increased. Pistol shot sounds may be heard over the large arteries. The circulation time is decreased and the A-V oxygen difference is small. The venous pressure is usually elevated and there may be marked peripheral edema. There is danger of sudden collapse and death.

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teen of eighteen deficient rats, electrocardiograms showed definite T wave changes consisting either of high waves with high origin or flat or inverted T waves often with low origin. Usually very high T waves were observed only the first time the rat became deficient succeeding deficiencies being accompanied more often by flat waves. The rate, as well as the complex changes, rapidly returned to normal with sufficient doses of crystalline vitamin B<sub>1</sub> with or without increase in the food intake. In two cases high T waves became inverted for a short time after vitamin B<sub>1</sub> was given. In certain instances no T wave changes appeared although the rate fell to the same low level which had previously been accompanied by abnormal T waves.

In order to throw light on the mechanism of these cardiac changes adrenalin and atropine were injected and vagus section was carried out on a few rats. Few changes in rate or in complexes were observed. This is in agreement with the statement of Diury Harris and Maudsley that the bradycardia of vitamin B deficiency in rats unlike the heart block produced in pigeons is not of vagus origin.

The hearts of deficient rats were more sensitive to trophanthin than normal rats as indicated by depression of the ST interval or inversion of the T wave. Two deficient rats died after one fourth the dose which is fatal for normal rats.

Dr. Weiss continued the discussion on the Relationship of Vitamin Deficiency and Cardiovascular Dysfunction. He reported on a study of the water content of the right and of the left ventricles, as well as on the rectus muscle in a group of patients exhibiting vitamin deficiencies in a normal group, and a control group with organic heart disease. The studies failed to reveal any change in the water content of the cardiac or rectus muscle in the vitamin deficiency group. The weight of the heart may be normal or increased in vitamin B deficiency diseases (polyneuritis, pellagra, beriberi). Frequently, but not necessarily there may be a dilation of the right side of the heart. Interstitial edema so called and a vacuolization of the muscle cells as well as of the cells of the conductive tissue is frequently present. These latter findings are in accordance with the observation made by Wenckebach on the beriberi heart in Java. The observations at the Boston City Hospital however indicate that the findings are not specific in this condition for similar findings were observed in control cases.

The electrocardiographic changes as well as the manifestations of cardiac insufficiency and peripheral circulatory collapse responded to rest to diuretics and to specific treatment with parenteral crystalline vitamin B<sub>1</sub> or to the oral administration of vitamin extract and a highly nutritious diet. In some of the cases the responses to vitamin B<sub>1</sub> and to vitamin extract were rather prompt and striking in others rather slow. At present it is not possible to formulate a definite conclusion as to the specificity of the treatment. It appears however that if the cardiac failure is of some duration and remains untreated

the response even to crystalline vitamin B<sub>1</sub> may be slow. It has been observed that the parenteral administration of crystalline vitamin B<sub>1</sub> produced within 24 to 48 hours a marked appetite in deficient patients who suffered from anorexia of several weeks duration. Further studies are now in progress.

#### THE AMERICAN ACADEMY OF TROPICAL MEDICINE

The third annual meeting of the American Academy of Tropical Medicine was held in Baltimore Maryland, on November 18 1936. Dr. Richard P. Strong, Professor of Tropical Medicine at the Harvard Medical School delivered the President's Address upon 'The Modern Period of Tropical Medicine.' Dr. Ernest Muir of London Secretary of the British Empire Leprosy Relief Association delivered an address upon 'Recent Progress in Tropical Medicine in India.' Dr. W. A. Sawyer, Director of the International Health Division of the Rockefeller Foundation was elected President for 1937. Dr. George C. Shattuck, Assistant Professor of Tropical Medicine at the Harvard Medical School was elected a member of the Council. Dr. E. V. Cowdry, Professor of Cytology at Washington University, and Dr. Fred L. Soper of the Rockefeller Foundation were elected to membership, and Dr. W. Schüffner Director of the Institute voor Tropische Hygiene in Amsterdam, was elected to honorary membership.

#### FAULKNER HOSPITAL CLINICAL MEETING

The regular monthly clinical meeting was held at the Faulkner Hospital on Thursday afternoon December 3 at 5:00 p. m.

The first case was that of a baby who had died just after birth. The mother was a primipara and the baby had a face presentation. It was decided to do a version rather than a cesarean which was successfully accomplished. The aftercoming head was delivered by pressure on the fundus rather than by the application of forceps. The postmortem examination showed a tear in the tentorium on both sides with resulting hemorrhage. The point was brought out in the discussion that a certain percentage of breech presentations in primiparae are bound to end in fatality to the baby but it was not felt for this reason that such cases should have a cesarean section done. It was also brought out that it is still an unsettled question whether it is better to exert pressure through the fundus or apply forceps.

The second case was that of a woman 76 years of age who had had indigestion over rather an indefinite time and had recently developed an increasing and painless jaundice. X-ray examinations of the gallbladder and gastrointestinal tract were not of assistance in making a diagnosis and the patient was finally explored as a diagnostic procedure but with the feeling that there probably was an inoperable cancer at the head of the pancreas and all that could be accomplished would be an anastomosis be



tween the gallbladder and the small intestine. At operation however, a small adenocarcinoma of the papilla of Vater was found which was excised and the pancreatic and biliary ducts reimplanted in the duodenum. This case illustrates the importance of using exploration as a diagnostic procedure in cases of complete obstructive jaundice in which a definite diagnosis cannot be made by other methods.

Following the presentation of these two cases a photograph of the hands of a surgeon who had been permanently crippled as a result of operating under the x-ray was shown. With the tendency to operate under the x-ray in fracture work there are developing an increasing number of x-ray injuries among surgeons and it is important for surgeons to realize how definite this danger is. Apparently there is a misunderstanding among surgeons in regard to what is meant by shock proofing an x-ray apparatus. Some surgeons think that this is a form of protection against x-ray burns but it is only a protection against being electrocuted by the machine.

Following this Dr Arthur T Hertig gave an illustrated talk on The Pathology of Abortions. He reported two hundred cases of which practically all were spontaneous abortions and called attention to the fact that 70 per cent of these were due to some defect of the embryo or of the membranes. He showed some interesting pictures of ova which had failed to develop and called attention to the fact that certain of these ova which are blighted tend to develop into moles the longer they stay in the uterus and the moles tend to become malignant as time goes on. In view of the fact that by the use of hormones abortions are sometimes prevented he raised the question as to whether it would not be better to let abortions occur and try for a subsequent pregnancy, in view of the fact that a beginning abortion may indicate a diseased ovum which will end in a congenital malformation of some sort, or possibly develop into a malignant mole. This idea did not appeal to some of the clinical obstetricians who emphasized the great number of patients who would go through a successful pregnancy and have a normal baby after having had in the early months of pregnancy a little flowing which quieted down under rest in bed.

Dr Hertig felt that it was so unusual for a normal ovum to abort spontaneously that such an occurrence tended to arouse the suspicion of an artificial interruption of the pregnancy.

Of his cases 30 per cent of abortions were due to maternal causes and of these a reasonable number were due to low implantation of the ovum in the uterus. Here again the question was raised as to whether it would not be better to let such an abortion proceed after it started than to try to check it because these are the cases which eventually lead to placenta praevia.

In the maternal causes infection of one sort or another plays a part and if these infections could be cleared up the abortions might be avoided. Of the whole series of sixty cases in which spontaneous

abortions occurred due to maternal causes in only 20 per cent could some procedure have been attempted which would have obviated the accident.

### BOSTON UNIVERSITY MEDICAL SOCIETY

One of the country's foremost authorities on diabetes Dr Elliott P Joslin was the speaker at a meeting of the Boston University Medical Society November 30 in the Evans Memorial Auditorium. Dr Joslin's subject was Recent Developments in the Treatment of Diabetes. Dr Howard M Clute of the faculty presided.

This was the second in a series of monthly meetings to be held by the recently formed Medical Society which was inaugurated for the purpose of broadening the viewpoint of both medical students and physicians. Future meetings will be based on a wide variety of medical topics of both immediate and future interest.

Dr Joslin has been engaged in the practice of medicine in Boston since 1895 and has been connected with the Harvard Medical School since 1898 when he began his work as an assistant in physical chemistry. He has been clinical professor of medicine since 1922. Dr Joslin is consulting physician at the Boston City Hospital. He is a Fellow of the American Academy of Arts and Sciences and holds membership in the Association of American Physicians, the American Medical Association and the American Philosophical Society. He is the author of The Treatment of Diabetes Mellitus and A Diabetic Manual.

### JOINT MEETING OF THE BOSTON COUNCIL OF SOCIAL AGENCIES AND THE BOSTON HEALTH LEAGUE

The Boston Council of Social Agencies and the Boston Health League will hold their Annual Meetings jointly on January 7 1937 at the Hotel Vendome. Dinner which is \$1.50 will be served at 6:30 p.m.

The speakers Dr Henry D Chadwick chairman and Dr Gaylord W Anderson Secretary of the Massachusetts State Health Commission will present a summary of the legislation which the Commission is introducing at the next session of the legislature. If the work of the Commission in recodifying the health laws of the state is to be effective bills must be passed. Come and learn how you may help to secure the passage of this legislation.

You are cordially invited to attend. Please make your reservation by January 5. Make checks payable to the Boston Health League Room 1104 80 Federal Street Boston.

### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY DECEMBER 28 1936

Tuesday December 29—

9:30 a.m. Massachusetts General Hospital Thoracic Clinic  
Ethel Dome

**Wednesday, December 30—**

- 8 a m Massachusetts General Hospital Grand Rounds Orthopedic Department  
 112 m Clinical-Pathologic Conference Children's Hospital Amphitheater  
 4 p m - 5 p m Surgical Pathological Conference Dr Cutler and Dr Wolbach Peter Bent Brigham Hospital

**Thursday, December 31—**

- 8 a m Massachusetts General Hospital Circulatory Clinic Rounds  
 \*8 30 - 9 30 a m Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and the Children's Hospitals held this week at the Children's Hospital  
 11 a m Massachusetts General Hospital Medical Grand Rounds Ether Dome  
 12 m Massachusetts General Hospital Clinical-Pathologic Conference

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

January 7—Joint Meeting of the Boston Council of Social Agencies and the Boston Health League See page 1259

January 10 March 21—Sunday Afternoon Lectures at the Harvard Medical School See page 1141 issue of December 10

January 14—Pentucket Association of Physicians Hotel Bartlett 95 Main Street, Haverhill at 8 30 p m

January 15—William Harvey Society 8 p m in the Auditorium of the Beth Israel Hospital Boston

January 15—Boston Society for the Advancement of Gastroenterology See page 1145 issue of December 10

January 20—Illustrated Lecture at the Robert B Brigham Hospital See page 1256

February 3—American Social Hygiene Association See page 1186 issue of December 17

February 25, 26, 27—The New England Hospital Association Hotel Statler Boston

March 30 April 2—First International Conference on Fever Therapy Postponement notice See page 52 issue of July 2

April 21 24—American Society for Experimental Pathology See page 1075 issue of May 21

October 25 29—American College of Surgeons Chicago Illinois

**DISTRICT MEDICAL SOCIETIES****ESSEX SOUTH DISTRICT MEDICAL SOCIETY**

January 6—Meeting at the Danvers State Hospital Hithorne 5 p m

**FRANKLIN DISTRICT MEDICAL SOCIETY**

Will meet at the Weldon in Greenfield at 11 a m the second Tuesdays of January March and May

CHARLES MOLINE M.D. Secretary

Sunderland

**MIDDLESEX EAST DISTRICT MEDICAL SOCIETY**

January 13—Bear Hill Golf Club Stoneham

March 16—Danvers State Hospital Danvers

May 11—Bear Hill Golf Club Stoneham

KENNETH L MACLACHLAN M.D. Secretary  
 1 Bellevue Avenue Melrose

**NORFOLK DISTRICT MEDICAL SOCIETY**

January 19—8 15 p m The Peter Bent Brigham Hospital Communications and Case Presentations by the Staff Suggested title—Abdominal Pain from the Medical and Surgical Standpoint Details of program to be announced

February 23—Time place and details of program to be announced

March 30—8 15 p m New England Deaconess Hospital A Symposium on Diabetes entitled A Survey of the Diabetic Work of the George F Baker Clinic in the New England Deaconess Hospital Communications and Case Presentations by the Staff Drs Elliott P Joslin Howard F Root Priscilla White Alexander Marble and Allen P Joslin

May—Annual Meeting Details to be announced

Note The Censors will meet for the examination of candidates on the first Thursday of May 1937 Fee of \$10.00 is payable at the time of examination Application blanks may be obtained by writing the Secretary furnishing name address and name of school of graduation

In medicine Application must be made at least three weeks prior to date of examination Candidates whose applications are on file will receive proper notices

FRANK S CRUICKSHANK, M.D., Secretary  
 1247 Beacon Street Brookline

**PLYMOUTH DISTRICT MEDICAL SOCIETY**

January 21—11 a m Bridgewater State Farm

March 18—11 a m Brockton Hospital

April 15—Annual Meeting 11 a m Ducey Hospital

May 20—11 a m Lakeville State Sanatorium

FRED F WEINER M.D., Secretary  
 231 Main Street Brockton

**SUFFOLK DISTRICT MEDICAL SOCIETY**

January 27—Boston Medical Library 8 15 p m Joint Meeting with the Boston Medical Library Anthropology Dr Carleton S Coon

March 31—Boston Medical Library 8 15 p m 'Social Insurance—It Affects the Medical Profession' Dr Charles E Mongan Discussion Dr Channing Frothingham

April 28—Annual Meeting Boston Medical Library 8 15 p m Problems in Surgical Diagnosis Dr Howard M Clute

CONRAD WESSELHOEFT M.D. President  
 CHARLES C LUND M.D., Secretary

**WORCESTER DISTRICT MEDICAL SOCIETY**

January 13—Worcester City Hospital Worcester Mass 6 15 p m Dinner—complimentary by the hospital 7 30 p m Business session and scientific program

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ERWIN C MILLER M.D., Secretary  
 27 Elm Street Worcester

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VOLUME 215

DECEMBER 31, 1936

NUMBER 27

## THE ETHER DAY ADDRESS, MASSACHUSETTS GENERAL HOSPITAL, OCTOBER 16, 1936

### The Study and Treatment of Heart Disease at the Massachusetts General Hospital from 1821 to 1936

BY PAUL D. WHITE, M.D.<sup>\*</sup>

IN October 1846, ninety years ago a young laborer named Patrick Hurley entered Ward 29 of the Massachusetts General Hospital for the relief of palpitation and breathlessness. These symptoms had developed in June and had forced him to give up working in September. For three weeks he had been under the care of a physician, who had failed to give him relief by a blister over the heart. On admission to the hospital he was found to have a rapid pulse, which was very irregular in both rhythm and force. Apparently there was a musical murmur at the apex of the heart though its description was very vague. No diagnosis was made, in retrospect now it is evident that he was suffering from rheumatic heart disease with uncontrolled arrhythmia.

An astonishing story follows. For over four months this young man was kept in the hospital with apparently no benefit whatsoever and in March, 1847, he was discharged still suffering from tumultuous rapid, irregular heart action. No chart was kept nor was any temperature taken, the clinical thermometer and charts were later innovations. Rest, vegetable diet and the old standby of those days, bichloride of mercury, were ordered at the beginning of his stay, and throughout the months there was no change except that the mercury bichloride solution was gradually increased in dosage from ten drops to forty drops three times daily. Finally, the doctors were content when in November the patient complained of sore gums. The mercury was then suspended and a dose of castor oil was given. We can conclude at least that mercury does not help this kind of heart trouble and we can be grateful that we did not live in the days of such heroic treatment.

Little or no advance in the understanding of heart disease in this hospital is evident from the perusal of the patients' records during the first twenty-five years of the existence of the institution which opened its doors in 1821 or in the next twenty-five years, following the introduction of ether anesthesia for surgical operations.

Those fifty years were in this respect a sterile period, here as they were all over the world, despite certain brilliant contributions of which I shall speak shortly.

In the spring of 1822, the hospital's first year, a lad of 15 years was admitted with a complaint of malaise and palpitation and a story of pains in the legs off and on for several years. His heart was enlarged and to aid in its examination the new-fangled stethoscope was used. The inexperience of the times and the difficulty of hearing much of anything through the old wooden cylinder rendered the attempt as useless as the efforts of the doctors in the professional ballad of Oliver Wendell Holmes which I shall quote shortly. The report of the auscultation was that the heart "sound was not great", whatever that means. A blistering plaster was laid on the region of the heart, the ubiquitous bichloride of mercury was ordered daily, and a diet was prescribed which consisted of bread and milk night and morning, plain pudding for dinner and meat once in three days. Two weeks later the blister was suppurating and keeping the patient awake at night. In another two weeks when the blister had dried the terse order was given, "Let it be renewed." Six weeks after his entrance to the hospital it was noted that he was more pale than when he entered and somewhat emaciated. At least there is the virtue of frankness here. Finally three months after admission he was discharged without comment or record of any diagnosis. Reading between the lines we may infer that here as well as elsewhere there was still medieval treatment for an unrecognized acute rheumatic infection involving the heart.

In July, 1875, a carpenter named John Reid 52 years old, was admitted to the hospital for so-called valvular disease of the heart. The history now contains some notes about diseases in the family and a little more detail in the past history of the patient himself. His present complaint was of shortness of breath increasing over a period of six months and of swelling of his feet and ankles for five weeks past. Examination revealed great breathlessness on the slightest exertion requiring his sleeping in a chair at night. He showed an enlarged

<sup>\*</sup>White, Paul D.—Physician, Massachusetts General Hospital. For record and address of author see This Week's Issue 145-153.

**Wednesday, December 30—**

- 8 a m Massachusetts General Hospital Grand Rounds Orthopedic Department  
 12 m Clinical-Pathologic Conference Children's Hospital Amphitheater  
 4 p m - 5 p m Surgical Pathological Conference Dr Cutler and Dr Wolbach Peter Bent Brigham Hospital

**Thursday, December 31—**

- 8 a m Massachusetts General Hospital Circulatory Clinic Rounds  
 \*8 30 - 9 30 a m Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and the Children's Hospitals held this week at the Children's Hospital  
 11 a m Massachusetts General Hospital Medical Grand Rounds Ether Dome  
 12 m Massachusetts General Hospital Clinical-Pathologic Conference

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

January 7—Joint Meeting of the Boston Council of Social Agencies and the Boston Health League See page 1259

January 10 March 21—Sunday Afternoon Lectures at the Harvard Medical School See page 1141 issue of December 10

January 14—Pentucket Association of Physicians Hotel Bartlett 95 Main Street Haverhill at 8 30 p m

January 15—William Harvey Society 8 p m in the Auditorium of the Beth Israel Hospital Boston

January 15—Boston Society for the Advancement of Gastroenterology See page 1145 issue of December 10

January 20—Illustrated Lecture at the Robert B Brigham Hospital See page 1256

February 3—American Social Hygiene Association See page 1186 issue of December 17

February 25, 26, 27—The New England Hospital Association Hotel Statler Boston

March 30 April 2—First International Conference on Fever Therapy Postponement notice See page 52 issue of July 2

April 21 24—American Society for Experimental Pathology See page 1075 issue of May 21

October 25 29—American College of Surgeons Chicago Illinois

**DISTRICT MEDICAL SOCIETIES****ESSEX SOUTH DISTRICT MEDICAL SOCIETY**

January 6—Meeting at the Danvers State Hospital Hathorne 5 p m

**FRANKLIN DISTRICT MEDICAL SOCIETY**

Will meet at the Weldon in Greenfield at 11 a m the second Tuesdays of January March and May

CHARLES MOLINE M D Secretary  
 Sunderland

**MIDDLESEX EAST DISTRICT MEDICAL SOCIETY**

January 13—Bear Hill Golf Club Stoneham

March 15—Danvers State Hospital Danvers

May 11—Bear Hill Golf Club Stoneham

KENETH L MACLACHLAN M D Secretary  
 1 Bellevue Avenue, Melrose

**NORFOLK DISTRICT MEDICAL SOCIETY**

January 19—8 15 p m The Peter Bent Brigham Hospital Communications and Case Presentations by the Staff Suggested title—Abdominal Pain from the Medical and Surgical Standpoint Details of program to be announced

February 23—Time place and details of program to be announced

March 30—8 15 p m New England Deaconess Hospital A Symposium on Diabetes entitled A Survey of the Diabetic Work of the George F Baker Clinic in the New England Deaconess Hospital Communications and Case Presentations by the Staff Drs Elliott P Joslin Howard F Root Priscilla White Alexander Marble and Allen P Joslin

May—Annual Meeting Details to be announced

Note The Censors will meet for the examination of candidates on the first Thursday of May 1937 Fee of \$10 00 is payable at the time of examination Application blanks may be obtained by writing the Secretary furnishing name address and name of school of graduation

in medicine Application must be made at least three weeks prior to date of examination Candidates whose applications are on file will receive proper notices

FRANK S CRUICKSHANK, M D Secretary  
 1247 Beacon Street Brookline

**PLYMOUTH DISTRICT MEDICAL SOCIETY**

January 21—11 a m Bridgewater State Farm

March 18—11 a m Brockton Hospital.

April 15—Annual Meeting 11 a m Ducey Hospital.

May 20—11 a m Lakeville State Sanatorium

FRED F WEINER M D, Secretary  
 231 Main Street Brockton

**SUFFOLK DISTRICT MEDICAL SOCIETY**

January 27—Boston Medical Library 8 15 p m Joint Meeting with the Boston Medical Library Anthropology Dr Carleton S Coon

March 31—Boston Medical Library 8 15 p m 'Social Insurance—It Affects the Medical Profession' Dr Charles E Mongan Discussion Dr Channing Frothingham

April 28—Annual Meeting Boston Medical Library 8 15 p m Problems in Surgical Diagnosis Dr Howard M Clute

CONRAD WESSELHOEFT, M D President  
 CHARLES C LUND M D Secretary

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In July, 1875, a carpenter named John Reid, 52 years old, was admitted to the hospital for so-called valvular disease of the heart. The history now contains some notes about diseases in the family and a little more detail in the past history of the patient himself. His present complaint was of shortness of breath increasing over a period of six months and of swelling of his feet and ankles for five weeks past. Examination revealed great breathlessness on the slightest exertion requiring his sleeping in a chair at night. He showed an enlarged

\*White, Paul D.—Physician, Massachusetts General Hospital. For record and address of author see This Week's Issue 1460-1473.

heart, murmurs of aortic and mitral valvular insufficiency and swelling of his legs. A minute amount of the tincture of digitalis was ordered and increased slowly, never to an adequate amount and entirely without any obvious benefit up to the time of his death from increasing dropsy eight days after entering the hospital. Gin was given in a futile attempt to turn the tide or else to make his last days more endurable, and finally his feet were punctured as a last resort. Much serum flowed out but he went rapidly on to his death. With adequate digitalis and diuretic therapy this man would almost certainly have survived that particular spell of heart failure.

It is of course very easy in this age to criticize the treatment and diagnoses of those days in 1822, 1846 and 1875. I dare say our successors fifty to one hundred years from now will look back with equal surprise and incredulity at our gross ignorance and apparent neglect. But it is truly astonishing to realize the vast strides that have been made in our own generation in the understanding of medical science, as exemplified by the heart and its diseases. Without any doubt the advance in this field has been greater in the last fifty years than in all the centuries before. And in this advance the Massachusetts General Hospital has made its share of contributions.

It is of the greatest interest to peruse the diagnosis index of the volumes of the records of the ward patients in the first third of the hospital's existence, that is, from 1821 to 1860, and to note the medical diseases with which the staff had to cope. First place was taken by pulmonary tuberculosis with 33 solid pages of names of patients, which averaged about 35 names to a page. A close second was typhoid fever with 32 pages. Then came acute rheumatism with 21 pages, dyspepsia with 18, chronic rheumatism with 13, pneumonia 11, bronchitis 9, unspecified fever 9, diarrhea 6, syphilis 5, dysentery 4 and only scattered recognized cases of such conditions as troubles with the nervous system, the heart and the kidneys. There were no complete and satisfactory cardiac diagnoses, those that were given were anasarca, cardialgia, carditis, dyspnea, endocarditis, dilatation of the heart, hypertrophy of the heart, palpitation of the heart, disease of the heart, edema, pericarditis and one case of angina pectoris. Between 1860 and 1870 3 more cases of angina pectoris were added, one case of aortic regurgitation, and one of rupture of the aorta.

In contrast the cardiac diagnoses of the one year 1934 led all the rest with 1,261 cases, founded so far as possible on the tripod of cause, structural change and functional condition. Tuberculosis of the respiratory system was diagnosed in 212 cases that same year, typhoid fe-

ver in only 8, acute rheumatic fever in 51 and chronic rheumatism in 246.

The great increase in the importance of the heart problem at the Massachusetts General Hospital, both absolutely and relatively, in the last century is well illustrated by these figures. Here is certainly one reason why the great advance in our knowledge of heart disease has occurred, we have been forced by its very magnitude to put more workers on the job, to spend more and more of their time.

Before leaving the dark period of ignorance about the heart of one hundred years ago I would pay tribute to several brilliant contributions made by observant physicians prior to that day, contributions that flashed across the sky, only to be ignored as a rule, or quickly forgotten, or but little applied to the practice of medicine.

Benivieni and a few of his contemporaries in Italy about 1500 had shown for the first time that heart disease was possible without causing instant death. Realdus Columbus in the middle of the sixteenth century taught the circulation of blood through the lungs and in 1628 Harvey completed the work of the Italian physiologists with his masterly treatise. In 1733 an English parson named Hales measured blood pressure for the first time, but no further attention was paid to this for a hundred years and the idea was not utilized in medical practice for nearly two hundred years. In 1715 Vieussens described in detail the coronary arteries, in 1768 Heberden introduced the term angina pectoris, and at the end of the eighteenth century Jenner of smallpox fame put together these two observations, namely, angina pectoris and the coronary arteries. In 1728 Lancisi of Rome introduced the conception of heart failure and in 1832 Hope completed its fundamental principles. In 1749 Senac in Paris advised the use of quinine for rebellious palpitation, a method of treatment that was rediscovered by a patient of Professor Wenckebach in 1914. In 1775 William Withering's attention was called to the value of the foxglove in dropsy and he published a treatise of the greatest practical value in 1785, and yet one hundred years later his advice was not being followed, even here at the Massachusetts General Hospital. In 1761 Auenbrugger of Vienna introduced percussion as a method of medical examination, but for over forty years this was ignored until Corvisart, physician to Napoleon Buonaparte, advised its use in 1808, one year before Auenbrugger died. In 1819 Laennec introduced the stethoscope, but for fifty years or more this instrument was as much a hindrance as a help. The common disregard for the value of auscultation in the study of heart disease in the middle of the last century is entertainingly expressed in

a ballad by Oliver Wendell Holmes who was Physician at the Massachusetts General Hospital from 1846 to 1849

### THE STETHOSCOPE SONG A PROFESSIONAL BALLAD

There was a young man in Boston town  
He bought him a stethoscope nice and new  
All mounted and finished and polished down  
With an ivory cap and a stopper too

It happened a spider within did crawl  
And spun him a web of ample size  
Wherein there chanced one day to fall  
A couple of very imprudent flies

The first was a bottle-fly big and blue  
The second was smaller and thin and long  
So there was a concert between the two  
Like an octave flute and a tavern gong

Now being from Paris but recently  
This fine young man would show his skill  
And so they gave him his hand to try  
A hospital patient extremely ill

Some said that his liver was short of bile  
And some that his heart was over size  
While some kept arguing all the while  
He was crammed with *tubercles* up to his eyes

This fine young man then up stepped he  
And all the doctors made a pause  
Said he—The man must die you see  
By the fifty seventh of Louis's laws

But since the case is a desperate one  
To explore his chest it may be well  
For if he should die and it were not done  
You know the *autopsy* would not tell

Then out his stethoscope he took  
And on it he placed his curious ear  
*Mon Dieu!* said he with a knowing look  
Why here is a sound that's mighty queer

The *bourdonnement* is very clear—  
*Amphoric buzzing* as I'm alive'  
Five doctors took their turn to hear  
*Amphoric buzzing* said all the five

There's *emphyema* beyond a doubt  
We'll plunge a trocar in his side—  
The diagnosis was made out  
They tapped the patient so he died

Now such as hate new fashioned toys  
Began to look extremely glum  
They said that *rattles* were made for boys  
And vowed that his *buzzing* was all a hum

There was an old lady had long been sick  
And what was the matter none did know  
Her pulse was slow though her tongue was quick  
To her this knowing youth must go

So there the nice old lady sat  
With phials and boxes all in a row  
She asked the young doctor what he was at  
To thump her and tumble her ruffles so

Now when the stethoscope came out  
The flies began to buzz and whiz—  
O ho! the matter is clear no doubt  
An *aneurism* there plainly is

The *bruit de rape* and the *bruit de scie*  
And the *bruit de dial'e* are all combined  
How happy Bouillaud would be  
If he a case like this could find'

Now when the neighboring doctors found  
A case so rare had been described  
They every day her ribs did pound  
In squads of twenty so she died

Then six young damsels slight and frail  
Received this kind young doctor's cares  
They all were getting slim and pale  
And short of breath on mounting stairs

They all made rhymes with sighs and skies,  
And loathed their puddings and buttered rolls  
And dieted much to their friends surprise  
On pickles and pencils and chalk and coals

So fast their little hearts did bound  
The frightened insects buzzed the more  
So over all their chests he found  
The *rule sifflant*, and the *rule sonore*

He shook his head—there's grave disease—  
I greatly fear you all must die  
A slight post mortem if you please  
Surviving friends would gratify

The six young damsels wept aloud  
Which so prevailed on six young men  
That each his honest love avowed  
Whereat they all got well again

This poor young man was all aghast  
The price of stethoscopes came down  
And so he was reduced at last  
To practise in a country town

The doctors being very sore  
A stethoscope they did devise  
That had a rammer to clear the bore  
With a knob at the end to kill the flies

Now use your ears all you that can,  
But don't forget to mind your eyes  
Or you may be cheated like this young man  
By a couple of silly abnormal flies

And now we come to the days of forty years ago Great changes began at the end of the nineteenth century The intensive study of medical problems by capable men was beginning, no longer did all physicians do general practice—obstetrics surgery and medicine There was the beginning of widespread concentration in these fields, that is, the real beginning of specialization Outstanding internists, such as Calvin Ellis Frederick Shattuck Reginald Fitz, James Mmott, James Jackson, Herman Vickery and Richard Cabot, began to appear on the staff of the Massachusetts General Hospital and others including Henry Jackson, George Sears, W S Thayer and Joseph Capps, graduated here as house officers to go elsewhere to make for themselves outstanding names as authorities in the study and treatment of cardiovascular disease

Thus, when Andrew McGinn a laborer 60 years old was admitted to the hospital for study and treatment on February 13 1900, a great change in the understanding of heart dis-

heart, murmurs of aortic and mitral valvular insufficiency and swelling of his legs. A minute amount of the tincture of digitalis was ordered and increased slowly, never to an adequate amount and entirely without any obvious benefit up to the time of his death from increasing dropsy eight days after entering the hospital. Gin was given in a futile attempt to turn the tide or else to make his last days more endurable, and finally his feet were punctured as a last resort. Much serum flowed out but he went rapidly on to his death. With adequate digitalis and diuretic therapy this man would almost certainly have survived that particular spell of heart failure.

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Benivieni and a few of his contemporaries in Italy about 1500 had shown for the first time that heart disease was possible without causing instant death. Realdus Columbus in the middle of the sixteenth century taught the circulation of blood through the lungs and in 1628 Harvey completed the work of the Italian physiologists with his masterly treatise. In 1733 an English parson named Hales measured blood pressure for the first time, but no further attention was paid to this for a hundred years and the idea was not utilized in medical practice for nearly two hundred years. In 1715 Vieussens described in detail the coronary arteries, in 1768 Heberden introduced the term angina pectoris, and at the end of the eighteenth century Jenner of smallpox fame put together these two observations, namely, angina pectoris and the coronary arteries. In 1728 Lancisi of Rome introduced the conception of heart failure and in 1832 Hope completed its fundamental principles. In 1749 Senac in Paris advised the use of quinine for rebellious palpitation, a method of treatment that was rediscovered by a patient of Professor Wenckbach in 1911. In 1775 William Withering's attention was called to the value of the foxglove in dropsy and he published a treatise of the greatest practical value in 1785, and yet one hundred years later his advice was not being followed, even here at the Massachusetts General Hospital. In 1761 Auenbrugger of Vienna introduced percussion as a method of medical examination, but for over forty years this was ignored until Corvisart, physician to Napoleon Buonaparte, advised its use in 1808, one year before Auenbrugger died. In 1819 Laennec introduced the stethoscope, but for fifty years or more this instrument was as much a hindrance as a help. The common disregard for the value of auscultation in the study of heart disease in the middle of the last century is entertainingly expressed in



titled "The Four Common Types of Heart Disease." This short and simple paper not only revolutionized cardiac diagnosis by introducing its most important element, namely cause or etiology, but it forced to the attention of the medical world the absolute necessity of paying more attention to the prevention of heart disease than to either its diagnosis or its treatment. While Sir James Mackenzie initiated important progress by stirring up interest in the functional disorders of the circulation, Richard Cabot rendered much more vital service in his analysis of the fundamental factors behind heart disease. It takes a generation nearly its lifetime to appreciate some of the things its living members are doing and have done, in accord with this we are only now realizing the importance of Richard Cabot's contributions of twenty to twenty-five years ago. It is due time that we pause a moment and belatedly acknowledge our indebtedness to one who has given so much to medicine and particularly to those of us who are working in one of his chosen fields, the study of heart disease.

Furthermore, it was Cabot who instituted hospital social service in this country thirty-one years ago in his effort to help, at first this hospital's patients, and then other patients all over the world. This service has grown so fast and so large that we can hardly follow its ramifications, but to one of these I shall refer again as it deals with the home care of children with heart disease. Finally, and, I believe, most important of all, it was and is Cabot who rightly insists that more vital than the medical care, more vital than the social service that we render our patients, is the nurture of the spiritual side of those that have entrusted themselves to us. The wise physician does this important service in his private practice almost unconsciously and thereby has a hold in his community, possible for no other member of that community except it be a rare devoted minister of the gospel. It was in large part Richard Cabot's teaching that I followed when I wrote on the "Heart of a Child" in 1933 as follows: "What is the use of all this study and work if one simply spreads the fear of heart disease and if the children whose hearts are affected grow up to be hopeless and helpless under sheltering care? It would be better if they would not survive if that is all that can be done for them. Even education consisting in training the mind alone in school curriculums, helpful and important as it is, will not suffice. Far more must be done. Things that are often neglected, especially in so-called modern times, must be given careful attention. *One must revive, nourish, and protect the spiritual heart of the child.*"

With this pioneer work of Richard Cabot's as a background may I now proceed to give you

a glimpse of the experience in the further development of our knowledge of heart disease that has been the fortunate lot of those of us that have devoted our time to this field at the Massachusetts General Hospital during the past twenty years. In the course of my recital I must perforce give you some personal adventures, but these are presented in entire modesty and at the end in a word I will show why they cannot be presented otherwise.

As a fourth year medical student I had the privilege of having some optional instruction from Joseph Pratt who was full of the enthusiasm in the newer studies of the functional disorders of the circulation handed on to him by James Mackenzie, whom he had helped to discover in the mining town of Burnley in the north of England. After my graduation from school and hospital and study abroad under this same master, Mackenzie, and his pupil, Thomas Lewis, I returned in 1914 to assist Dr. Pratt and Dr. Eustis in the newly organized adult and children's heart clinics in the Outpatient Department. Here we puzzled over obscure heart cases and here we learned that it was often better to spend a long time on one case than to feel obliged to abandon patient and solution of his problem just because the usual scheduled hour or half hour was up. I do not want to advise the upsetting of necessary schedules and programs or selfish disregard for the time of others, but I do want to say that on several occasions in the past fifteen years punctual adherence to the usual daily routine of work and play of the so-called efficient American life would have ruined our pursuit of some clinical problem that has made us all better doctors or would have left unhelped some patient who sorely needed our aid, but who required more than the usual length of time for this accomplishment.

While I was medical interne in the years 1912 and 1913 under the stimulating tutelage of Drs. Richard Cabot, William H. Smith ("Big Bill" as we called him) and Roger I. Lee, two of the new methods of study of cardiac cases were becoming firmly established. It was now for the first time the custom to measure the blood pressure in all patients and to obtain x-ray pictures of the heart whenever there was uncertainty about heart size or diagnosis. We still talked about Bright's disease to the exclusion of hyperpiesia; however, we called coronary thrombosis, angina pectoris or acute indigestion and we had not yet learned the significance of such a condition as auricular fibrillation.

In 1913 two events occurred which inaugurated the new cardiac program that has followed. Mr. Skinner, a patient of Dr. William H. Smith's, through him offered to aid the progress of medical science at the Massachusetts General Hospital, and it was decided to install

ease was in progress. In his case, family history, habits and present illness were concisely recorded. McGinn had been well until a month earlier, when shortness of breath and palpitation developed on effort. A rapid increase of these symptoms was followed by swelling of the legs during the week before admission. Examination revealed a well developed and well-nourished man with blue lips, prominent neck veins, visible arterial pulse in the neck, enlargement of the heart accurately defined, absolute cardiac arrhythmia, blowing systolic murmur at the apex of the heart, accentuation of the pulmonary second sound, rapid pulse of high tension, moist rales at the lung bases and edema of the legs extending into the thighs. The temperature was now routinely recorded and also the respiratory rate, the blood examination and urine analysis.

Treatment included absolute rest, tincture of digitalis in adequate amounts and a diuretic drug, theobromine sodium-salicylate.

Two days after admission there was a note of great improvement. Both the breathlessness and the dropsy had almost disappeared. He had passed 173 ounces of urine in the previous twenty-four hours, and an order was written to measure the day and night amounts.

On February 20 he had improved so much that the foxglove was omitted, on the twenty-first day it was noted that his pulse was much slower and on the twenty-sixth he was up and about, completely relieved. He was discharged three days later with a diagnosis of general arteriosclerosis, interstitial nephritis (or Bright's disease) and cardiac hypertrophy with relative mitral insufficiency.

If this man were to enter the hospital today, we could hardly have treated him better. The one important addition to his treatment would be the continuation of a daily ration of foxglove permanently, an important omission until recent years in the practice of most physicians except a few very wise men, who, like Henry Jackson, realized its value even in the old days. As for routine study we would now gain some help from three sources not clinically available in 1900—blood pressure estimation, x-ray study and electrocardiography. We would recognize now that the fundamental cause of McGinn's heart trouble was high blood pressure and not kidney disease, that the uncontrolled cardiac arrhythmia, which we call auricular fibrillation, had precipitated his symptoms and that the mitral valve insufficiency was the result of his heart failure, points of fundamental importance that have become common knowledge in the years since 1900. But we would still be ignorant of the most important fact of all, namely, the cause of the high blood pressure.

I am sure that the physicians of the last gen-

eration and of our own are not more brilliant or industrious than were those of Ether Day, 1846, or before, and yet the contrast in diagnosis and treatment of patients with heart disease then and now is startling and almost incredible. What is the answer? It must be already obvious, but as I go on it will be increasingly so, I would make it the chief burden of my song.

Mention has already been made of the great clinicians of the end of the nineteenth century and of the beginning of the present century, who by their experience and contributions put the Massachusetts General Hospital in the very van of our increasing knowledge about heart disease. I would speak further of a few of these men and of their successors.

It was my good fortune while in the medical school to attend the clinical lectures on heart disease given by Dr. Frederick Shattuck. Through his rare ability, rich experience and special interest in the subject he passed on to his associates and to us sound judgment of the foremost knowledge of the day. The influence of his teaching was deep and far flung, much greater than that of anything he ever put into writing. He excelled both in diagnosis and in treatment.

But the greatest contributor in the field of heart disease in the history of the Massachusetts General Hospital, as well as in Boston, has been Richard Cabot, who is still working for the cause of the hospital and for the health of the minds, of the bodies and of the souls of this community. It is with especial pleasure, gratitude and affection that I tender this tribute to him today. He was my medical chief at home and during the World War abroad, where I learned to know him best and to appreciate at their true worth his mind and heart, which I fear have sometimes been misunderstood. It was he who worked intensively to improve our acumen in the diagnosis of heart disease, which has been one of his particular interests, witness of which is his volume, entitled, "Facts on the Heart." It was he who constantly insisted that we keep our feet on the ground in the days when our enthusiasm in the study of functional disorders, important though it was, tended to distract our attention from the study of structural pathology. His clinicopathological conferences stand as unique contributions, they have never been equalled. It was he who made the most important American contribution to cardiology, one of the greatest landmarks of all time in the history of the development of our knowledge of cardiovascular disease. Already an experienced medical leader of international reputation and so much a figure then, in 1914, that in Europe I was asked if he could still be alive he published a paper in the *Journal of the American Medical Association* enti-

symptoms and signs, to enlargement of the right ventricle (particularly the acute cor pulmonale), to heart failure, especially when it primarily involves the left ventricle, and to congestion of other origin, in particular that due to chronic constrictive pericarditis. The diagnostic help afforded by electrocardiograph and x-ray and by other methods of examination we have studied in detail. But *the kinds and causes of heart trouble have been our prime interest* following the lead of Richard Cabot, for here we are aiming at our real goal, *the prevention of heart disease*, which is still beyond our reach. Congenital, rheumatic, bacterial, hypertensive coronary disease and nervous factors are the important ones. We have helped to attack these by trying to learn more about them in each type of heart disease. Different colleagues of our group have taken particular interest and are going on with a more concentrated study. It is impossible for one man now to cover adequately the whole field, and yet only fifteen years ago when I was starting my own specialized work on heart disease I was warned that my professional interest would become too narrow, that the field was too small. But heart disease is now the leading cause of disability and death.

Finally, our studies have included the treatment of heart disease by drugs, such as digitalis and its allies and quinidine by physical methods, as in the use of special beds and Souther's tubes, and particularly by the development of a good mental attitude in the patient through the efforts of doctors and of social workers. Optimism and the improvement of the home care of heart patients have been *keynotes*.

The bulk of what has been accomplished here in heart study in the past fifteen years would have been impossible without the wholehearted cooperation of the administrative and medical staffs, in particular Drs Washburn, Bigelow, Faxon, Edsall and Means, who have helped us tremendously *by letting us alone* to pursue our concentrated specialized work and by the frequent assignment of Dalton Scholarships to the research fellows. We have been spared the routine chores that not so long ago would have been deemed necessary for our own welfare. I herewith express my own great satisfaction at this course, which I am certain has been a wise one, and I hope it may be allowed to continue to operate in other fields besides our own. Hospital community and medical science are all certain to benefit greatly thereby.

And now, before closing I return to the chief motive and inspiration behind the advance of the heart work at the Massachusetts General Hospital since 1895, the first half of this period of forty years I had no hand in but tradition had begun and it was easy to carry on. The

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After the war, in 1920, we started afresh, reiterating our belief in the fundamental principle of concentrating for years on the clinical study of the circulation a thing that even at that late date was not being done widely in internal medicine. Fortunately some parts of the body had already escaped from the domination of the omniscient professor of the Middle Ages to the great advantage of medical science and particularly of the sick man himself. The teeth, the nose and throat, the eye, the brain and nerves, the bladder, injuries, pregnancy and childbirth, all had emerged long before the heart was considered important enough to be studied in concentrated detail itself. In those early days, only sixteen years ago, it was often suggested that the field of cardiology and its name were beneath the dignity of a young physician trained in internal medicine, but the handwriting was already on the wall for those who would stop and read. I even suspect that the general consulting internist will some day cease to be, he will have served his function, a very important one in his stage of the history of medical progress, but a function that now can best be shared by family physicians and specialists, both in hospital and in private practice. Even the correlation of research is no longer a major role of the general internists, the special workers themselves are best able by their experience and intelligence to observe where their fields meet and interlace and thereupon to cooperate in their studies. We have found this to be so in our own work joining directly with family physician, roentgenologist, surgeon, pathologist, social service worker, physiologist and neurologist in the pursuit of our

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## EVALUATION OF THE SIGNS OF ACTIVE RHEUMATIC FEVER WITH ESPECIAL REFERENCE TO THE ERYTHROCYTE SEDIMENTATION RATE AND LEUKOCYTE COUNT\*

BY BENEDICT F. MASSELL, M.D.,† AND T. DUCKETT JONES, M.D.†

THE common findings during acute rheumatic fever are tender and painful joints, with or without associated swelling and redness fever, subcutaneous nodules, precordial pain rash (typically of the erythema marginatum type), chorea, epistaxis and evidence of cardiac involvement. Furthermore, these clinical manifestations are usually accompanied by an elevated leukocyte count and rapid erythrocyte sedimentation rate, and sometimes a prolongation of auriculoventricular conduction time as detected by the P-R interval of the electrocardiogram.

With recovery of the patient these clinical and laboratory signs eventually subside except for the evidences of permanent cardiac involvement. As a rule, the regression of these signs is so gradual that the disease passes from an acute to a chronic stage. In this respect rheumatic fever is more comparable to tuberculosis than to the acute infectious diseases. As long as any of these clinical and laboratory signs persist, active rheumatic fever must be considered as being present, though possibly in a low grade form.

Since there is no specific test for rheumatic fever it is only by the recognition of persistent and often easily overlooked manifestations that the presence of the active disease is made known. Exacerbations are frequently noted in those individuals who have been allowed physical activity soon after the acute stage of their illness. In addition the development of heart disease during the months just subsequent to clinical symptoms of rheumatic fever is also common. It is, therefore, important to determine the duration of the activity of the rheumatic fever process.

The purpose of this report is to evaluate the various signs of active rheumatic fever, especially those by which the low-grade stage of the infection may be recognized. This involves particularly an investigation of the relative merits of laboratory tests.

### MATERIAL STUDIED

The present report is based on a study of 178 patients with active rheumatic fever observed at the House of the Good Samaritan during the

periods, January, 1932 to May, 1933, and September, 1934 to December, 1935. The ages varied from 3 to 27 years and averaged 10 years.

In 163 of these cases an analysis has been made of the routine laboratory tests and a comparison made of the leukocyte count and erythrocyte sedimentation rate in respect to their value as tests for active rheumatic fever. The clinical manifestations have been analyzed as well in 73 of the patients with clinical evidence of rheumatic fever, and in these the relation of laboratory tests to the clinical signs has been determined. The frequency with which the laboratory tests were performed has varied with the individual case from once a month to twice a week.

### LABORATORY TESTS FOR INFECTION

The value of the leukocyte count as a test for active rheumatic fever has been emphasized by Swift, Miller, and Boots,<sup>1</sup> who pointed out that an elevated count frequently persisted after all manifestations of rheumatic fever had disappeared. The erythrocyte sedimentation rate has become established as a test for infection, chiefly through the work of Fahraeus.<sup>2</sup> More recently this test has been applied to the study of rheumatic fever and most investigators<sup>3</sup> who have worked with it have acclaimed it superior to all other tests, including the leukocyte count. The popularity of the erythrocyte sedimentation rate has reached so great a magnitude that today there is a dangerous tendency to depend wholly upon it.

Before proceeding with our findings in regard to this, it is necessary to consider certain facts about the tests themselves.

**THE LEUKOCYTE COUNT**—Gairey and Bryan<sup>4</sup> recently have written an extensive review of the literature concerning the leukocyte count and its variations. They conclude that, as the leukocyte count increases above 10,000, the chances of its occurrence in a normal individual decrease rapidly. We have therefore, accepted the arbitrary level of 10,000 as a fair upper limit of normal for the leukocyte count in the present analysis. It has been our experience that rheumatic fever subjects followed for long periods after active rheumatic fever eventually have a leukocyte count of under 10,000.

The leukocyte count is easily and quickly determined, but its accuracy is not great. This has been emphasized particularly in papers by Biantdt,<sup>5</sup> Ponder, Saslow, and Schweizer,<sup>6</sup> and

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studies Hospital and medical school services must continue to be administered by the ablest executives and teachers, as they have in the past, but always time and space and money should be spared here at the Massachusetts General Hospital for the active work of clinical investigators who are practicing medicine, men and women who are not only at work in some concentrated field at the beginning of their career when their experience is limited and not very valuable, as has been largely the custom, but also those who continue for years in their chosen field with the increasing value of their ripening experience, which rolls up like a ball of snow. Such workers are the natural selection for the teaching of progressive medical graduates a function that is certain to assume in time its proper place as a vitally important part of medical education, the undergraduate instruction has become highly developed while the equally important graduate instruction has been allowed to grow like Topsy.

There has been a fashion in our day to over-emphasize superficial and evanescent clinical research, encouraged by the flitting about from subject to subject, from city to city and from clinic to clinic after the period of the young physician's early training has passed. This course does not produce the sound results in medical knowledge and advance that concentration in one subject and in one clinic is bound to produce when one is surrounded by able workers in other fields of medical science and now and then travels about to learn what is going on elsewhere. The only real difficulty that we have encountered in our experience here has been the constant temptation to leave our work partly done and to migrate to other fields of medical endeavor, in teaching, administration or research, here or in other places, but the motive handed on, often unconsciously, by Richard Cabot, Thomas Lewis and other leaders has held us to our post. It is now becoming increasingly evident that this has been wise. In hospital clinics and in private practice there are now many patients that we, ourselves, have followed carefully for ten to fifteen years and more, and daily they are revealing to us new facts or problems and giving us the answers to questions that could not have been solved without our own personal prolonged study of co-operative and intelligent persons.

I emphasize herewith the great value of contact with private patients in medical practice and investigation, and congratulate the hospital for the part past, present and future, played by the Phillips House and especially by the Baker Memorial. It has been my experience that both in teaching and in investigation private patients are essential for the best results. It is rather obvious that this should be

so. In the first place, the higher average in intelligence of the private patient permits the drawing of more accurate clinical pictures of disease, secondly, his cooperation is more readily secured for the same reason and because of the close personal relation between doctor and patient, thirdly, he is more easily followed up over long intervals of time, and finally, study after death is more often possible, with all the wealth of new information that is available thereby.

Another fact I wish to take a moment to emphasize is that we have made more progress by the simple but concentrated study of quite ordinary symptoms and signs than by the use of the newer instruments, as important as they are. It is worthy of comment that the greatest advance of all in our study of cardiovascular disease has been in history taking and physical examination and in simple observations of other nature, all possible hundreds of years ago, but neglected because no one took the simple step of devoting time intensively to them.

I would refer also to the advances made by a study of errors, both in diagnosis and in treatment. To the beginners in medicine especially I would urge the cultivation of this field, our own richest finds have come from it. Do not scorn or hide your errors! When anything unexpected or exceptional confronts you, jot it down on your list of problems to take up either at once or when you have time, that list will grow steadily and you will have some of it to hand on to your successor.

My closing word is the most important of all. It is our aim to make this hospital eventually unnecessary and to close its doors if that happy time ever should arrive. Already the hospital is unnecessary for much that it had to do a scant twenty years ago, as in the care of patients with typhoid fever and infantile dysentery. In order to effect this aim we must do more than to perfect an ideal routine for the diagnosis and treatment of disease. We must set aside ample leisure, space and money for the intensive study of the diseases of all parts of the body in the advance to our ultimate goal, the prevention of disease. Oliver Wendell Holmes wrote in 1860

What makes the Healing Art divine?  
The bitter drug we buy and sell,  
The brands that scorch the blades that shine  
The scars we leave the cures we tell?

Are these thy glories holiest Art —  
The trophies that adorn thee best —  
Or but thy triumph's meanest part —  
Where mortal weakness stands confessed?

And lo! the starry folds reveal  
The blazoned truth we hold so dear  
To guard is better than to heal —  
The shield is nobler than the spear!



This table represents an analysis of the clinically active group as a whole, irrespective of the severity of the illness. It will be seen that if there are clinical signs of active rheumatic fever, laboratory signs also are likely to be present. Not uncommonly, however, one or the other laboratory test may be normal, and occasionally both tests may be normal simultaneously in the presence of obvious clinical rheumatic fever.

For purposes of further discussion the clinical variations of rheumatic fever may be divided as follows: (1) severe rheumatic fever, (2) moderately severe rheumatic fever, (3) low grade rheumatic fever. Although there were only 73 cases analyzed, the total of the following three groups is 97. This seeming discrepancy is the result of variations of rheumatic fever in some of the same patients during the period of observation.

**SEVERE RHEUMATIC FEVER**—This group includes 24 patients, 14 of whom died. Fever was usually but not always present. More commonly the rectal temperature ranged between  $101^{\circ}$  and  $102^{\circ}$ . Rises to  $103^{\circ}$  were not uncommon but fever of  $104^{\circ}$  to  $105^{\circ}$  was infrequent. The fever was often cyclic.

There was no correlation between the height of the fever and the severity of the infection nor was there any correlation between the degree of elevation of the laboratory tests and the height of the temperature. When the patient was obviously acutely ill, the leukocyte count was in the majority of instances above 10,000 and usually well above this level. The corrected sedimentation index on the other hand, although also frequently quite high was sometimes disproportionately low for the severity of the illness, and in some instances was even within normal limits.

Thus, of these 24 patients who were obviously acutely ill, the leukocyte count was consistently elevated well above normal in 16 while the corrected sedimentation index was consistently elevated in only 12 (50 per cent). When the leukocyte count was elevated, it was usually 14,000 to 16,000, but it was not infrequently higher than this and occasionally reached 20,000 to 30,000. An elevated corrected sedimentation index usually ranged between 0.7 mm and 1.0 mm per minute, but not infrequently was 1.1 to 1.4 mm per minute, and reached as high as 1.9 per minute.

Westergren<sup>10</sup> has shown that congestive failure may lower the erythrocyte sedimentation rate under circumstances where one would expect it to be elevated. This may be the explanation for the frequency of low corrected sedimentation indices in this group of very ill patients. For of seven who had indices well within normal limits five had frank congestive failure.

Congestive failure occurred only in patients who were relatively ill. In fact, in our experience, congestive failure in young patients has always been associated with other evidence of active rheumatic fever and therefore in itself should be considered a reliable sign of active infection. This is in accordance with the post-mortem findings of Rothschild, Kugel, and Gross,<sup>11</sup> who found anatomic evidence of active rheumatic fever in the hearts of sixty out of sixty-one patients who died with congestive failure within the first two decades of life.

**MODERATELY SEVERE RHEUMATIC FEVER**—There were 13 patients who at some stage of their illnesses appeared obviously but not dangerously ill. All of them had some degree of fever in addition to one or more other signs of rheumatic fever. The fever was usually cyclic, though in a few instances it was sustained. In general the rectal temperature charts had peaks reaching  $101^{\circ}$  to  $103^{\circ}$ , but in several the level remained under  $101^{\circ}$ .

The leukocyte count was definitely elevated in 7 of these patients ranging between 12,000 and 16,000. In the remaining 6 patients it fluctuated around 10,000 (8,000 to 13,000).

Of these 13 patients, 11 (84 per cent) had a consistently elevated corrected sedimentation index (0.6 to 1.4 mm per minute), but 2 had periods when the corrected sedimentation index was normal in the face of obvious infection.

**LOW-GRADE RHEUMATIC FEVER**—There were 60 patients who at some period did not appear to be ill and yet showed one or more clinical signs of rheumatic fever. Such low-grade rheumatic fever usually manifested itself by low-grade fever, nodules, rash, epistaxis, precordial pain, or mild joint pains, either individually or in combination. The rectal temperature elevations were usually between  $100^{\circ}$  and  $101^{\circ}$ . Where the fever was prolonged (several months or more) it was usually cyclic in nature. The term fever has been used to denote rises in rectal temperature above  $100^{\circ}$ .

In the majority of the cases with low-grade clinical rheumatic fever, one or both laboratory tests were elevated with abnormal leukocyte counts ranging from 12,000 to 15,000, and abnormal corrected sedimentation indices varying from 0.5 to 1.0 mm per minute. Normal laboratory tests (one or both) in the presence of clinical signs of infection were occasionally found. Thus, there were 12 patients in whom definite clinical signs of active infection continued in spite of a normal corrected sedimentation index. The case histories are briefly summarized, and the signs of active rheumatic fever shown during the period of a normal C.S.I. The leukocyte count was also normal in the first 9 patients, but in the last 3 it was found to be elevated. In all 12 instances there was clinical

Yates and Batt.<sup>7</sup> As a check on our accuracy duplicate determinations were made in a series of 25 counts. Although many of the differences were small, in some instances they were as great as 1,000 to 1,500 (10 per cent to 17 per cent). Furthermore, many investigators<sup>8</sup> have shown that there is a daily variation in the white blood cell count and a diurnal variation as well. Since the leukocyte count during the convalescent stage of rheumatic fever is usually not greater than 12,000 to 14,000, a single determination is considered to be unreliable. Nevertheless, if repeated counts are made over a period of time and the trend noted, the test becomes more valuable.

**THE ERYTHROCYTE SEDIMENTATION RATE**—There are numerous methods for determining the erythrocyte sedimentation rate. The one used in the present study is with minor modifications that devised by Rouke and Ernstene.<sup>9</sup> Repeated observations (usually every 5 minutes) over a period of one to one and one-half hours are made on a sample of heparinized blood in a graduated Wintrobe tube, and the maximum rate of fall of the red cells in millimeters per minute is determined. This is known as the sedimentation index. Since anemia in itself will increase the rate of fall, the tube is centrifuged, the hematocrit determined, and a correction made. The corrected value is called the corrected sedimentation index and is abbreviated CSI. The upper limit of normal for the cor-

rected sedimentation index is 0.38 mm per minute.

In contrast to the leukocyte count, the corrected sedimentation index is a more complicated test involving both time and a venipuncture. Nevertheless, when it is abnormal it is likely to be elevated far above the normal level so that it is more easily evaluated. This is obviously a distinct practical advantage. Daily unexplained variations of significant degree occur frequently enough to warrant check-up determinations before drawing definite conclusions.

#### CORRELATION OF CLINICAL SIGNS AND LABORATORY EVIDENCE OF ACTIVE RHEUMATIC FEVER

Of 121 successive admissions analyzed for clinical as well as laboratory signs of rheumatic fever, 73 (60 per cent) had clinical evidence of rheumatic fever, while 48 (40 per cent) had only laboratory signs of infection. The duration of these clinical signs of activity varied from a few days to as long as 12 months and averaged 3.4 months. The clinical manifestations observed in this series in their order of frequency were as follows: fever, nodules, chorea, epistaxis, joint pains, precordial pain, rash (usually the erythema marginatum type), congestive failure, abdominal pain, pneumonia, pericarditis, and pleurisy. The incidence and duration of these various signs have been summarized in table 1.

Table 2 summarizes the laboratory findings during the period of clinical manifestations.

TABLE 1  
INCIDENCE AND DURATION OF THE CLINICAL SIGNS OF RHEUMATIC FEVER  
OBSERVED IN 73 PATIENTS

Sign	Case Incidence	Per Cent of Active Cases	Duration*	
			Range	Average
1 Fever	39	53%	1 wk to 12 mos	2.4 mos
2 Nodules	30	41%	3 wks to 12 mos	3.1 mos
3 Chorea	21	29%	3 days to 4 mos	3.2 wks
4 Epistaxis	18	25%	1 wk to 8 mos	2.3 mos
5 Joint Pains	17	23%	1 day to 2 mos	2 wks
6 Rash	14	19%	1 day to 6 mos	2 mos
7 Precordial Pain	14	19%	1 to 5 days	2 days
8 Congestive Failure	13	18%	2 wks to 3 mos	1 mo
9 Abdominal Pain	10	14%	1 to 5 days	2 days
10 Pneumonia	7	9.5%	3 days to 2 wks	1 wk
11 Pericarditis	5	6.8%	3 days to 2 wks	1 wk
12 Pleurisy	4	5.4%	3 days to 2 wks	1 wk

\*The duration noted is the time during which the symptoms were frequently, though not necessarily constantly, present.

TABLE 2  
THE LEUKOCYTE COUNT (W B C) AND CORRECTED SEDIMENTATION INDEX (C S I)  
IN 73 PATIENTS WITH CLINICAL MANIFESTATIONS OF RHEUMATIC FEVER

	Both Tests Elevated	C S I Elevated W B C Normal	W B C Elevated C S I Normal	Both Tests Normal
Case Incidence	50	17	21	12
Average Duration	2.2 months	2.0 months	2.0 months	2.1 months

During the clinical course of the disease the status of some patients changed sufficiently to necessitate their inclusion in the analysis two or more times. Thus it will be seen that the total of the four columns is 100 rather than 73.

vated laboratory tests in rheumatic fever subjects are significant, and that in the majority of instances they are indicative of persistent low grade (subclinical) rheumatic fever.

The following four case reports illustrate such instances of prolonged abnormal laboratory findings.

**CASE 1** A. C. House of the Good Samaritan No 5351 is a 12 year old male with a negative family history and past history. This patient had definite attacks of rheumatic fever in April and December 1928, and chorea for 7 weeks in 1930. In March 1931 he had a third attack of rheumatic fever with fever, swollen, tender joints, and epistaxis. He was seen at the Adolescent Cardiac Clinic of the Massachusetts General Hospital, and placed with the Children's Mission. Upon being transferred to the House of the Good Samaritan in June 1931 he did not appear sick, and there were no clinical signs of rheumatic fever, but the leukocyte count was 19,000. His heart was borderline in size and there was a moderate mitral systolic murmur and a short mid-diastolic murmur. During August he had frequent low grade fever (up to 100.8° R.), joint pains and vomiting. The leukocyte count ranged between 15,000 and 19,000. He improved and remained asymptomatic in spite of a leukocyte count of 11,000 to 12,000 until October, when mild chorea appeared. The chorea, a borderline temperature (up to 100° R.) and an abnormal leukocyte count continued until June 1932. During this period the corrected sedimentation index was normal. Thereafter there was again general improvement and gain in weight but leukocytosis (10,000 to 14,000) persisted up to the time of discharge on October 30, 1932 (16 months after admission).

He did fairly well from October 1932 to March, 1933, except for one cold in December. In March, 1933, he had another cold and sore throat which was followed by a recurrence of chorea, several nosebleeds, and loss of weight. He remained in bed at home until April 13, 1933, when he was admitted to the House of the Good Samaritan for the second time. Examination showed an ill appearing boy with swollen, tender finger joints of the right hand, temperature of 101° (R.) and mild chorea. The cardiac findings were essentially the same as before; the leukocyte count was 17,000. On April 24 intravenous typhoid paratyphoid vaccine was given and was followed by an immediate frank rheumatic fever recrudescence with swollen, tender joints, fever of 103°-104° (R.) and a corrected sedimentation index of 1.4 mm. per minute. By the middle of May the fever, joint symptoms and chorea had subsided and the corrected sedimentation index had returned to normal. There was good weight gain and improvement followed but the leukocyte count remained elevated (11,000 to 13,000) up to discharge on November 22, 1933 (5 months after admission).

After discharge follow up examinations were made at the Massachusetts General Hospital Adolescent Cardiac Clinic at frequent intervals. He was soon found to be running a low grade fever (100°-101° R.), a leukocytosis of 10,000 to 20,000 and he again lost weight. In February, 1934 mild chorea was observed.

On July 24, 1934 he was admitted to the House of the Good Samaritan for the third time because of persistent chorea. In addition to the chorea he was found to have a slightly elevated temperature (100.2° R.), a leukocyte count of 12,000 and corrected sedimentation index of 0.50 mm. per minute. The heart was not enlarged, a slight mitral systolic murmur was present but no diastolic murmurs could

be made out. By August the chorea subsided, the temperature failed to rise above 100° (R.), and he had gained weight from 79 pounds to 102 pounds. The corrected sedimentation index returned to normal shortly after admission, but an elevated leukocyte count from 11,000 to 14,000 persisted. He was discharged on May 12, 1935 (10 months after admission).

Following discharge from the House of the Good Samaritan he was again seen frequently in the Adolescent Cardiac Clinic of the Massachusetts General Hospital. During this period he was fairly well except for several colds, occasional slightly elevated temperature and continued leukocytosis. On December 28, 1935 he had a sore throat and several weeks later, during January, 1936 there was an acute onset of migratory, tender joints and fever of 101.3° F. By February he had again improved and he continued symptom free thereafter until May, 1936 when he was again found to have mild chorea. The latter subsided by June, 1936. Throughout this period however, the leukocyte count remained elevated. Associated with this last attack of rheumatic fever there was apparently an increase in the degree of cardiac involvement. The heart became slightly enlarged, the systolic murmur became louder and there was an associated thrill while at the apex there was a definite diastolic rumble.

**CASE 2** A. S. House of the Good Samaritan No 5333 is a 15 year old male. His family history is negative and his past history was irrelevant until 1927 (aged 6 years) when a routine school examination revealed the presence of heart disease. There had been no previous rheumatic symptoms. During 1928 he was examined from time to time at the Massachusetts General Hospital Adolescent Cardiac Clinic. Because of several short periods of fever and failure to gain weight he was admitted to the House of the Good Samaritan where he remained from June 15, 1931 to December 23, 1931. During this period of six months the only definite evidence of active infection was a persistently elevated leukocyte count which gradually fell from 17,500 to 11,500. The corrected sedimentation index was not determined. Cardiac examination revealed slight enlargement of the heart, moderate mitral systolic and short mitral mid-diastolic murmurs, and a slight rough aortic systolic murmur.

During 1932 he had several upper respiratory infections, lost weight and continued to run a mild leukocytosis (10,000 to 15,000). Therefore, he was readmitted to the House of the Good Samaritan on October 21, 1932 and remained until January 1, 1933. During this period an elevated leukocyte count (11,000 to 15,000) and a failure to gain weight was again the only definite evidence of active infection. The corrected sedimentation index remained within normal limits during this period. The cardiac findings were essentially as before.

From early in 1933 to the end of 1934 observations at the Massachusetts General Hospital Adolescent Cardiac Clinic, revealed gradual improvement in appearance, gain in weight from 58 to 68 pounds and a constantly normal corrected sedimentation index. However, the leukocyte count continued to fluctuate between 10,500 and 15,500. During 1935 his status remained essentially the same except for four upper respiratory infections.

Early in January 1936 there was a frank rheumatic fever recrudescence which was ushered in by one to two nosebleeds daily. Two weeks later his face became puffy and his urine very dark in color. He gained 12 pounds in less than 3 weeks. On January 28, 1936 he was admitted to the Massachusetts General Hospital where he was found to appear moderately ill. There was edema of the face

ical evidence of rheumatic heart disease on examination

CASE 1 H S an 11 year old girl for a period of 2 months had persistent nodules and occasional epistaxis. The PR interval of the electrocardiogram was prolonged throughout this period.

CASE 2 F S a 16 year old boy, for a period of 1 month showed erythema marginatum almost daily and had a prolongation of the PR interval.

CASE 3 I F a 4 year old girl, had low grade fever (up to 101°) and occasional epistaxis for 2 months.

CASE 4 C B a 7 year old girl, had persistent epistaxis as the only sign of active rheumatic fever for a period of 4 months. Packing and cauterization frequently were necessary to stop the bleeding, which occurred from the anterior septal region on either

fever either an elevated leukocyte count or corrected sedimentation index, or both usually persist. In about 40 per cent of the cases the clinical signs had already subsided by the time the patient was admitted to the hospital, but laboratory signs of infection were present. The duration of the laboratory evidence of active rheumatic fever varied from 2 weeks to 12 months. Patients were rarely kept in the hospital for longer than 12 months because of laboratory evidence of infection alone.

In a series of 163 rheumatic fever subjects it was possible to compare the duration of infection as evidenced by the leukocyte count and corrected sedimentation index. From table 3

TABLE 3

COMPARISON OF THE LEUKOCYTE COUNT (W B C) AND THE CORRECTED SEDIMENTATION INDEX (C S I) AS TESTS FOR PERSISTENT ACTIVE INFECTION IN 163 RHEUMATIC FEVER SUBJECTS

	Persistent Elevation of W B C in Presence of a Normal C S I	Persistent Elevation of C S I in Presence of a Normal W B C	Simultaneous Return of Both Tests to Normal
Case Incidence	55	58	50
Per Cent	34.1%	35.5%	30.4%
Average Duration of Discrepancy	2.4 months	2.1 months	

side. Local examination showed no underlying pathology to explain this. In the past, nosebleeds had been her only symptom of rheumatic fever and yet she developed rheumatic heart disease with aortic regurgitation.

CASE 5 W B an 11 year old boy, for 5 months had a persistent erythema marginatum rash and frequent rises in temperature to slightly over 100°.

CASE 6 B H, an 11 year old girl, developed new nodules and for several days had joint pains at a period when the laboratory tests were normal.

CASE 7 R D, a 13 year old girl, had chorea and nodules for a period of one month. For 3 days during this period she also had joint pains.

CASE 8 L S, an 11 year old girl, had nodules for a period of one month.

CASE 9 S T, a 7 year old boy, had chorea, low grade fever and daily erythema marginatum for 3 months.

CASE 10 L K a 13 year old girl had joint pains over a period of several days. The leukocyte count was 14,000.

CASE 11 T B, a 5 year old boy had persistent cyclic low grade fever (100.5°-101°) for 5 months. During the first 3 months of this period nodules were also present. The leukocyte count averaged 12,000.

CASE 12 F B, a 15 year old boy, for one week had low grade but definite fever. The leukocyte count averaged 12,000.

From the above it is evident that laboratory tests although important, cannot be depended upon entirely for the recognition of low grade rheumatic fever. A careful search for clinical signs must also be made.

It is seen that in 50 patients both tests returned to normal at about the same time. In 58 patients, the corrected sedimentation index remained elevated longer, while in 55 patients, the leukocyte count persisted longer at an elevated level. The length of time that any one test remained abnormal longer than the other in the majority of instances varied from 2 weeks to 4 months and averaged 2.1 months for the corrected sedimentation index and 2.4 months for the leukocyte count.

Thus the leukocyte count and corrected sedimentation index are likely to indicate persistent infection with equal frequency. Since there is no constant correlation between the tests, one often being distinctly elevated when the other is well within normal limits, the determination of both tests is often necessary.

In most instances, after the subsidence of the clinical manifestations of rheumatic fever, abnormal laboratory findings return to normal within six months. Occasionally an elevated corrected sedimentation index or leukocyte count, or both, may persist without any associated clinical signs of infection. In such instances it has not always been possible to have the patient continue with bed rest for such a period. Upon discharge from the hospital they have been carefully observed in follow-up clinics, and a much restricted physical life is strongly urged. Some of these patients have had a recrudescence of clinically active rheumatic fever, but others have been followed for two years or more without any apparent change in their clinical or laboratory status. We believe that persistently ele-

#### THE LEUKOCYTE COUNT AND CORRECTED SEDIMENTATION INDEX IN RHEUMATIC FEVER PATIENTS WITHOUT CLINICAL SIGNS OR SYMPTOMS

It has already been pointed out that after the subsidence of the clinical signs of rheumatic

tracted rheumatic fever. Despite this, such changes were found at postmortem. The presence of subclinical rheumatic fever is thus demonstrated, as well as the importance of abnormal laboratory tests during such periods.

#### ELECTROCARDIOGRAPHIC EVIDENCE OF ACTIVE RHEUMATIC FEVER

Of 121 patients with active rheumatic fever there were 14 who at some time during the course of their illness showed a prolonged auriculoventricular conduction time as measured by the P-R interval of the electrocardiogram. Six of these had a normal corrected sedimentation index. Four of these 6 had other signs of rheumatic fever in addition to the long P-R interval, but in two patients the long P-R interval was the only sign of active rheumatic fever.

Thus, the electrocardiogram may present confirmatory evidence of the continuance of active rheumatic fever, and occasionally may be the only indication of the activity of the process.

#### OTHER FACTORS AFFECTING THE CORRECTED SEDIMENTATION INDEX

The interpretation of the corrected sedimentation index must be made with caution for it is an extremely sensitive test. It is not specific for rheumatic fever, and may be elevated by tuberculosis, renal infection, and many other diseases. Perhaps less well known, however, is the fact that seemingly minor events may cause the

tests, but no other evidence of active tuberculosis. The sedimentation rate was definitely elevated by the second day, but did not reach a maximum until the temperature was already on the decline. A normal level was not again reached until two to four weeks later. Bortree<sup>12</sup> likewise found that in normal individuals simple colds caused the sedimentation rate to become increased and remain rapid for four days to two weeks.

Our observations on the effect of sore throats (tonsillitis or pharyngitis) on the corrected sedimentation index in rheumatic fever subjects are confirmatory. In convalescent rheumatic fever patients with normal indices the sore throat was followed by elevated rates for as long as three weeks after the patient was apparently completely recovered. Cervical adenitis and other complications caused an abnormal level to continue even longer.

**TONSILLECTOMY**—Löhr<sup>13</sup> reported observations on the sedimentation rate in 50 patients with healing sterile wounds. Postoperatively the sedimentation rate rose as early as twelve hours and was always definitely above normal by twenty-four hours. Return toward normal did not begin until six to ten days later.

We have recorded in figure 1 the effect of tonsillectomy on the corrected sedimentation index in eight rheumatic fever subjects. These patients were all in the convalescent stage of their disease and at the time of the operation showed

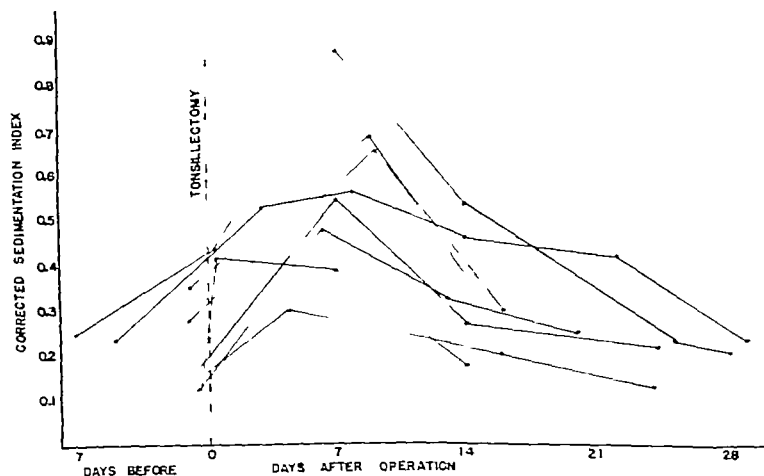


FIGURE 1 The effect of tonsillectomy on the corrected sedimentation index in eight rheumatic fever subjects

corrected sedimentation index to become and remain elevated for as long as two to three weeks. Two such events may be mentioned.

**UPPER RESPIRATORY INFECTIONS**—Westergren<sup>10</sup> observed the effect of tonsillitis on the sedimentation rate in three children with increased hilar glands and positive tuberculin

no evidence of active infection. The postoperative course was uneventful in all. It is seen from the chart that the corrected sedimentation index rose promptly after the operative procedure and that a return to the preoperative level in many instances was delayed for as long as two weeks.

and the liver edge was felt three fingerbreadths below the costal margin. The heart had become larger, the apex impulse being felt in the anterior axillary line. The rate was rapid and there were moderately loud mitral systolic and diastolic murmurs. There was no fever but the corrected sedimentation index was elevated (0.81 mm per minute), and the leukocyte count was 12,000. The urine contained a large trace of albumin and many red blood cells. Its specific gravity was 1.024. Blood NPN was 43 mg per cent, and the plasma protein 6.4 mg per cent.

The leukocyte count fluctuated between 12,000 and 20,000. On February 9, a pleural friction rub was heard and associated with this there was a temperature of 102°. The fever subsided after 4 days, and thereafter the patient gradually improved. He was discharged from the hospital to a convalescent home on March 13, 1936, at which time renal function tests were normal and the urine was negative except for a few red blood cells. The leukocyte count was 14,000.

**CASE 3** E S, House of the Good Samaritan No 5491, a 23 year old single female with negative past history and irrelevant family history, had rheumatic fever for the first time at the age of 12 (1921). Following this she remained well but a heart murmur was noted when she was 17 years old. Nevertheless, she continued symptom free until 1930 (aged 20) when associated with a protracted cold she became tired and dyspneic. Her physician prescribed digitalis and bed rest which gave only temporary improvement. In the fall of 1931 the dyspnea increased, she became nauseated and vomited, and her legs became swollen. In January, 1932 she was admitted to the Massachusetts General Hospital, where she was found to have rheumatic heart disease and generalized anasarca. Treatment with digitalis, diuretics, and Southey tubes caused only partial improvement in the congestive failure. During this period frequent low grade fever and a transient pericardial friction rub gave evidence of active rheumatic fever.

She was transferred to the House of the Good Samaritan on May 6, 1932 approximately 9 months after the onset of the congestive failure. Physical examination revealed an ill appearing young woman with orthopnea, moderate engorgement of neck veins, and edema of legs and sacrum. The heart was considerably enlarged with a faint apical systolic murmur and a well marked mitral diastolic murmur with a presystolic crescendo accentuation. The rhythm was regular.

With long bed care, digitalis and diuretics the patient gradually improved and became apparently edema free by September, 1932. Despite the disappearance of congestive failure as a clinical manifestation of active rheumatic fever, the P-R interval of the electrocardiogram was frequently prolonged (ranging from 0.19 to 0.23 seconds), and the corrected sedimentation index was moderately elevated (0.5 to 0.8 mm per minute). The former was possibly related to digitalis therapy but the latter could be explained only on the basis of active rheumatic fever. At no time did she have any joint pains, nosebleeds, nodules, rash or fever. The leukocyte count was always well within normal limits.

In February 1933 (9 months after admission to the House of the Good Samaritan) without any obvious precipitating cause except perhaps excitement she suddenly developed auricular fibrillation rapidly went into severe cardiac failure and died within 24 hours.

A postmortem examination revealed definite microscopic changes in the heart indicative of active rheumatic fever.

**CASE 4** E F, House of the Good Samaritan, No 4002, a 16 year old female with a negative family history and an irrelevant past history had rheumatic fever for the first time in 1924 (aged 6 years). In April, 1925, active rheumatic fever was manifested by nosebleeds and easy fatigue. She was admitted to the Boston Dispensary and on June 5, 1925, transferred to the House of the Good Samaritan. Her heart was slightly enlarged and there were mitral systolic and diastolic murmurs. Observation for 2 months revealed no clinical or laboratory evidence of active infection, and on August 7, 1925 she was discharged.

Check up examinations were made at the Boston Dispensary from 1925 to 1933. During this period she had frequent colds and four mild recurrences of rheumatic fever in 1929, March, 1930, April, 1931, and November 1931.

In January, 1933 there was a frank recrudescence of rheumatic fever with fever and joint pains and on February 8, 1933 she was admitted to the House of the Good Samaritan for the second time. Examination revealed that since 1925 there had been a marked advance in the cardiac involvement. The heart was considerably enlarged, and there was associated the signs of mitral stenosis and aortic regurgitation.

She remained at this hospital for 17 months and throughout this period there was a prolongation of the P-R interval of the electrocardiogram and frequent exhibitions of erythema marginatum rash. The corrected sedimentation index was usually elevated (0.5 to 1.2 mm per minute), but the leukocyte count was always under 10,000. In addition to these findings there were the following significant episodes.

In March 1933, there was a bout of fever (101°-102°) for one week, and several nosebleeds. On April 24, 1933 intravenous typhoid paratyphoid vaccine was followed by fever for 2 days and several nosebleeds. In September, 1933, there was again slight fever for 1 week. From November to December, 1933, the patient had occasional joint pains. On February 15, 1934 intravenous typhoid paratyphoid vaccine was again given and was followed by a definite increase in the P-R interval of the electrocardiogram, in addition to fever and joint pains for a few days. After the subsidence of this mild recurrence, the corrected sedimentation index remained abnormal and the P-R interval prolonged. On July 1, 1934 without evident cause, the patient had a severe chill. The temperature rose rapidly to 105° (R), and was followed by severe pulmonary edema. All attempts at therapy were to no avail. She rapidly became worse and died within 8 hours after the chill.

Postmortem examination demonstrated abundant evidence of active rheumatic fever.

The above four case reports give ample evidence of the chronicity of rheumatic fever and the frequency of recurrences. Further, they indicate that repeated abnormal laboratory findings, even in the absence of clinical signs or symptoms of rheumatic fever, must be interpreted as evidence of active rheumatic fever (elevated leukocyte count in cases 1 and 2, fast corrected sedimentation index in cases 3 and 4). It has been our clinical experience that patients showing persistently abnormal laboratory findings are peculiarly liable to recurrences of clinical rheumatic fever. In cases 3 and 4, death resulted too quickly for those pathologic changes to develop which are seen commonly in pro-

tracted rheumatic fever. Despite this, such changes were found at postmortem. The presence of subclinical rheumatic fever is thus demonstrated, as well as the importance of abnormal laboratory tests during such periods.

#### ELECTROCARDIOGRAPHIC EVIDENCE OF ACTIVE RHEUMATIC FEVER

Of 121 patients with active rheumatic fever there were 14 who at some time during the course of their illness showed a prolonged auriculoventricular conduction time as measured by the P-R interval of the electrocardiogram. Six of these had a normal corrected sedimentation index. Four of these 6 had other signs of rheumatic fever in addition to the long P-R interval, but in two patients the long P-R interval was the only sign of active rheumatic fever.

Thus, the electrocardiogram may present confirmatory evidence of the continuance of active rheumatic fever, and occasionally may be the only indication of the activity of the process.

#### OTHER FACTORS AFFECTING THE CORRECTED SEDIMENTATION INDEX

The interpretation of the corrected sedimentation index must be made with caution for it is an extremely sensitive test. It is not specific for rheumatic fever, and may be elevated by tuberculosis, renal infection and many other diseases. Perhaps less well known however is the fact that seemingly minor events may cause the

tests but no other evidence of active tuberculosis. The sedimentation rate was definitely elevated by the second day, but did not reach a maximum until the temperature was already on the decline. A normal level was not again reached until two to four weeks later. Bortree<sup>12</sup> likewise found that in normal individuals simple colds caused the sedimentation rate to become increased and remain rapid for four days to two weeks.

Our observations on the effect of sore throats (tonsillitis or pharyngitis) on the corrected sedimentation index in rheumatic fever subjects are confirmatory. In convalescent rheumatic fever patients with normal indices, the sore throat was followed by elevated rates for as long as three weeks after the patient was apparently completely recovered. Cervical adenitis and other complications caused an abnormal level to continue even longer.

**TONSILLECTOMY**—Lohr<sup>13</sup> reported observations on the sedimentation rate in 50 patients with healing sterile wounds. Postoperatively the sedimentation rate rose as early as twelve hours and was always definitely above normal by twenty-four hours. Return toward normal did not begin until six to ten days later.

We have recorded in figure 1 the effect of tonsillectomy on the corrected sedimentation index in eight rheumatic fever subjects. These patients were all in the convalescent stage of their disease and at the time of the operation showed

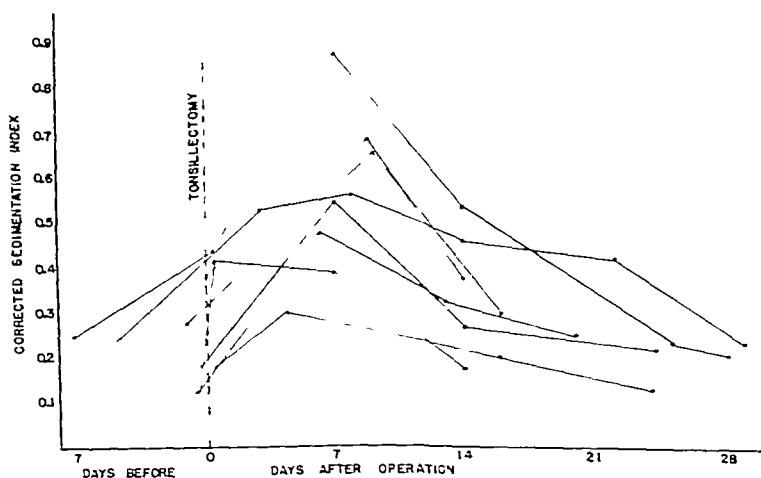


FIGURE 1 The effect of tonsillectomy on the corrected sedimentation index in eight rheumatic fever subjects

corrected sedimentation index to become and remain elevated for as long as two to three weeks. Two such events may be mentioned.

**UPPER RESPIRATORY INFECTIONS**—Westergren<sup>10</sup> observed the effect of tonsillitis on the sedimentation rate in three children with increased hilus glands and positive tuberculin

no evidence of active infection. The postoperative course was uneventful in all. It is seen from the chart that the corrected sedimentation index rose promptly after the operative procedure and that a return to the preoperative level in many instances was delayed for as long as two weeks.

## SUMMARY AND CONCLUSIONS

1 A clinical and laboratory study of 178 rheumatic fever subjects is presented.

2 The leukocyte count and corrected sedimentation index are helpful and often essential for the determination of low-grade rheumatic fever. In the majority of instances, after the clinical manifestations of the disease subsided, one or both of these tests continued at an elevated level for several weeks to many months.

3 As tests for low-grade rheumatic fever, the corrected sedimentation index and leukocyte count are of about equal value. In view of the large percentage of error in the technique of the leukocyte count, and the necessity for repeated counts, the corrected sedimentation index is more valuable as a single, isolated test.

4 One or both tests may be normal in the presence of clinical signs of rheumatic fever.

5 Corrected sedimentation index determinations are of no significance in the evaluation of active rheumatic fever if performed within two or three weeks after an upper respiratory infection or tonsillectomy.

6 Neither the leukocyte count nor the corrected sedimentation index is a specific rheumatic fever test, and must be interpreted with regard to other considerations.

7 In rheumatic fever subjects, repeatedly elevated leukocyte counts and rapid corrected sedimentation indices should be considered indicative of subclinical rheumatic fever in the absence of other cause for their abnormality.

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## CARCINOMA OF THE BREAST IN YOUNG WOMEN

BY GRANTLEY W TAYLOR, M D \*

THERE is fairly general agreement in the literature that carcinoma of the breast in young women differs in many respects from carcinoma of the breast in older women. The recent studies of Nathanson and Welch<sup>1</sup> demonstrate the effect of age on life expectancy in this disease and the grave prognosis in younger women. The gravity of prognosis in carcinoma of the breast associated with pregnancy or lactation has received considerable attention.<sup>2,3,4,5</sup> Inflammatory carcinoma of the breast<sup>6</sup> with its poor prognosis is largely confined to a young age group. Trout<sup>7</sup> has called attention to the

dangers of a subsequent pregnancy following apparent cure of the disease. Other evidence of difference in behavior of the disease has recently been brought forward by Dresser<sup>8</sup> and Martin,<sup>9</sup> who have demonstrated regression of established bone metastases following irradiation of the ovaries in a certain proportion of cases in cancer of the breast in young women.

The present study was undertaken to analyze further the causes of the difference in prognosis which have been observed. The cases of carcinoma of the breast observed at the Massachusetts General Hospital during the years 1921 to 1929 have already been presented in end-result studies.<sup>10,11,12</sup> These cases have been

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divided into three age groups, 146 cases 45 years or younger, 303 cases aged 46 to 60 inclusive and 156 cases over 60. The study is confined to the youngest and oldest groups, and roughly it may be said that the youngest group contains only women who have not yet passed the menopause, while those in the older group have certainly done so.

Although data on preoperative duration of carcinoma are unreliable, it was found that the younger women reported for examination considerably earlier than did the older women when cases of comparable extent were considered. Thus when the disease was confined to the breast without axillary involvement three quarters of the younger group reported an average duration of less than six months while only half of the older women recorded a similar brief duration.

The two groups were compared in regard to the presence or absence of axillary lymph node metastasis at the time of first examination. The results are shown in table 1. It is evident that 77 per cent of the younger group present axil-

TABLE 1

## AXILLARY INVOLVEMENT ON ADMISSION

Age	Under 46	Over 60
Axilla not involved	23%	43%
Axilla involved	77%	57%

lary involvement when first seen, while only 57 per cent of the older women present a comparable degree of extension. It is fair to say that carcinoma of the breast tends to metastasize to the axillary lymph nodes earlier in young women.

The groups were then compared in regard to the grade of malignancy, as shown by histologic study.<sup>12</sup> The result of such a comparison is shown in table 2. From this table it is

TABLE 2

## PATHOLOGIC GRADE OF MALIGNANCY

Age	Under 46	Over 60
Cases	146	156
Grade I	7%	16%
Grade II	49%	56%
Grade III	44%	28%

apparent that about 16 per cent of the older women present cancers of the lowest grade of malignancy, while only 7 per cent are highly malignant. This is in marked contrast to the younger group in which only 7 per cent are of the lowest grade, while 44 per cent present highly malignant growths. It is evident that, in general cancer of the breast is likely to be

of higher grade of malignancy in younger women than in older women.

Five-year cures were secured in 34 per cent of the younger group, and in 44 per cent of the older group (table 3). This difference is ade-

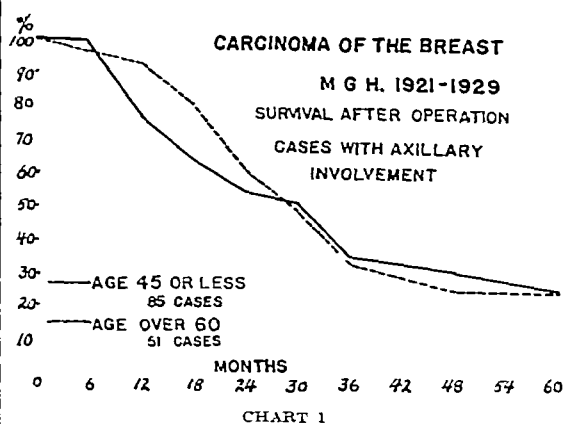
TABLE 3

## CURES WITH RADICAL OPERATIONS

Age	Under 46	Over 60
Cases	117	113
Cures	34%	44%
Cures—Axilla not involved	71%	67%
Cures—Axilla involved	20%	21%

quately accounted for by the differences in the two groups as regards axillary involvement and as regards the grade of malignancy. When comparison is made between disease of equal extent or of equal grade of malignancy in the two groups, the differences disappear. Thus cures in cases without axillary involvement in the young group were 71 per cent, in the old group 67 per cent. Cures in cases with axillary involvement were 20 per cent and 21 per cent respectively. Similar comparison can be made between the two groups for cases of comparable grades of malignancy. Although the numbers of cases become too small to permit percentage comparison it is evident that the age groups show no essential difference in the curability of comparable grades of malignancy of comparable extent.

The two age groups may be contrasted as regards the promptness of recurrence following radical operation (chart 1). In cases with



axillary involvement one year after operation 95 per cent of the older women still survive, as compared with 75 per cent of the younger group. Eighteen months after operation the figures are 80 per cent and 60 per cent respectively. The disparity diminishes later, and after 30 months the two groups are essentially alike. A similar chart for cases without axillary

involvement at the time of operation shows no essential difference between the two age groups

#### DISCUSSION

On the basis of observed regressions of established metastases following ovarian radiation, it has been proposed<sup>14</sup> that radiation artificial menopause be brought about postoperatively in young women as a prophylactic against recurrence. In the light of our analysis of this series of cases it is difficult to see how such a procedure would improve our present results of operation. The difference in five-year cures between the two age groups is adequately explained by the greater number of patients with highly malignant growths among the younger women, and the greater number of cases with established axillary metastasis at the time of operation. There is no evidence that ablation of ovarian function can modify the histologic characteristics of a malignant growth in the breast, nor can postoperative ovarian radiation affect the percentage incidence of axillary involvement at operation.

The difference in behavior of the two age groups as regards promptness of recurrence following operation, as shown in chart 1, might well be modified or diminished by postoperative artificial menopause. Apparently, the greatest benefit that could be hoped for would be to raise the curve of the younger group to that of the older group. It has been pointed out, however, that the difference between the two curves is evident only during the first few years, and that thereafter the two groups behave alike.

It is inevitable that a study such as this, which is concerned with operable carcinoma of the breast, cannot include a fair sample of the disease problem, especially as regards the younger group of patients. Figures as to operability are subject to wide variation, depending on the character of the hospital, the class of population which is served, and numerous other factors. It is likely that a larger percentage of cancers of the breast in young women are inoperable when first examined. This fact would be suggested by the more rapid rate of growth and the tendency to earlier metastasis observed in our series. Our series also does not include any cases complicated by pregnancy or lactation, or any cases of the inflammatory type. Instances of this sort emphasize the intimate

relation of certain carcinomas of the breast to hormonal influences. Finally, our series can shed no light on the mechanism of the regressions of metastases after ovarian radiation. It is especially these regressions which have justified the recommendation of postoperative prophylactic artificial menopause. Histologic study of areas of regression is greatly needed. It may be that this will provide evidence that the histologic characteristics of the disease may be modified by ovarian radiation.

#### CONCLUSIONS

Carcinoma of the breast tends to metastasize earlier in young women than in older women.

Carcinoma of the breast tends to be of higher grade of malignancy in younger women.

Postoperative recurrence takes place more promptly in younger women.

In carcinomas of the breast of equivalent extent and of equal grades of malignancy, age alone does not affect the curability.

There seems to be no ground for the inference that routine postoperative radiation of the ovaries would have modified appreciably the results observed in the younger age group.

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THE ROLE OF SCURVY IN THE ETIOLOGY OF  
CHRONIC SUBDURAL HEMATOMA\*

BY THEODORE HUNT INGALLS, M.D.†

THE purpose of this paper is to record certain suggestive evidence of the role which scurvy or a deficiency of vitamin C may play in the production of chronic subdural hematoma. Because of the recent impetus given to the study of scurvy by quantitative chemical analyses of ascorbic acid, in the tissues blood and urine<sup>1</sup> by the elucidation of its basic pathologic changes,<sup>2, 3</sup> and by its earlier x-ray recognition in infancy<sup>2, 3</sup> it appears that this is an opportune time for the publication of a conception evolved from a study of the subject during the past three years.

That chronic subdural hemorrhage is associated with poor hygiene and disturbance of nutrition in one form or another has long been recognized. Thus Doehle<sup>4</sup> noted the presence of rickets in at least 13 of 57 cases and Rosenberg<sup>2, 3</sup> after long experience with the disease stated he had never seen it occur in a healthy normally developed, breast-fed child. Sherwood<sup>5</sup> reported from The Infants' and The Children's Hospital in Boston, nine cases in 1930 and pointed out that five of the patients were cared for in institutions or by foster mothers.

In reviewing the histories of these cases attention was attracted to the possibility that scurvy may have been the underlying etiologic factor. Since x-ray studies of the long bones had been made in but five of the nine infants, those particular cases were selected for detailed study, the results are tabulated in table 1.

Of these five cases with chronic subdural hemorrhage three were found to have x-ray evidence of scorbutic changes in the long bones. In the other two cases the history and examination were suggestive of scurvy, though the x-rays exhibited no positive findings.

Hess and Unger<sup>6</sup> have said "It is evident that the fact that beading of the ribs may be of scorbutic origin has clinical and diagnostic significance. Unless we are certain that a baby has received an adequate quantity of antiscorbutic food, we are not justified in considering enlargement of the costochondral junctions of rachitic origin. The rosary may indeed be of two-fold nature as these two nutritional

disorders may, and frequently do, exist concomitantly." In the two infants without x-ray changes in the long bones, both exhibited costochondral changes and it was fairly certain that they had not received an adequate quantity of antiscorbutic food.

A tabulated comparison of the positive findings in the last two series of cases reported by Peet and Kahn and by Sherwood, reveals a strikingly poor social and nutritional background (table 2). Eleven of the eighteen patients were either illegitimate or had been cared for in foster homes, ten were specifically recorded as being artificially fed, and only one was stated to be breast-fed. It is of interest to note that in the case occurring in a breast-fed baby the onset was at thirteen months of age the latest in both groups. The disease did not occur until the breast feeding had been stopped.

Instances of subdural hemorrhage associated with acute scurvy are not wanting. Gilman and Tanzer<sup>7</sup> have reported a case in a boy of sixteen months who was breast-fed for two months, and then weaned on cow's milk with an inadequate supplement of orange juice. He was operated upon a clot extracted, and recovery ensued. These authors reviewed cases of a similar condition in infants reported by Sammis,<sup>8</sup> Ord,<sup>9</sup> Meyer,<sup>9</sup> Hayem,<sup>10</sup> and Sutherland.<sup>11</sup> Sutherland's two cases in 1893 are extremely interesting. They were girls with advanced scurvy, aged two years, and fourteen months, respectively. At autopsy each was found to have extensive subdural hemorrhage, in addition to which one had a soft, red gelatinous material in the spinal canal just beneath the dura, and the other had two subcortical hemorrhages. He concluded that these hemorrhagic lesions were the same as Virchow's *pachymeningitis interna hemorrhagica* because there was (1) a tendency to recurrent attacks of hemorrhage without local inflammation, (2) coagulation and organization of the extravasated blood, and (3) the effects were entirely those of mechanical pressure. He emphasized that "these conditions are also characteristic of the subperiosteal and other hemorrhages of scurvy."

In addition to these instances the American Pediatric Society's report<sup>12</sup> on infantile scurvy in 1898 set forward three of twenty nine deaths as due to cerebral hemorrhage. The diagnoses were made clinically. Stokes and Campbell<sup>13</sup> reported three fatal cases of infantile scurvy in one of which subdural hemorrhages were

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The term chronic subdural hematoma as used in these pages is synonymous with *pachymeningitis interna hemorrhagica* of the older writers.

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involvement at the time of operation shows no essential difference between the two age groups

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BY THEODORE HUNT INGALLS, M D †

THE purpose of this paper is to record certain suggestive evidence of the role which scurvy or a deficiency of vitamin C may play in the production of chronic subdural hematoma. Because of the recent impetus given to the study of scurvy by quantitative chemical analyses of ascorbic acid, in the tissues, blood, and urine,<sup>1</sup> by the elucidation of its basic pathologic changes,<sup>2, 15</sup> and by its earlier x-ray recognition in infancy,<sup>25</sup> it appears that this is an opportune time for the publication of a conception evolved from a study of the subject during the past three years.

That chronic subdural hemorrhage is associated with poor hygiene and disturbance of nutrition in one form or another, has long been recognized. Thus Doehle<sup>1</sup> noted the presence of rickets in at least 13 of 57 cases, and Rosenberg<sup>2</sup> after long experience with the disease stated he had never seen it occur in a healthy, normally developed, breast-fed child. Sherwood<sup>4</sup> reported from The Infants' and The Children's Hospital in Boston, nine cases in 1930 and pointed out that five of the patients were cared for in institutions or by foster mothers.

In reviewing the histories of these cases attention was attracted to the possibility that scurvy may have been the underlying etiologic factor. Since x-ray studies of the long bones had been made in but five of the nine infants, those particular cases were selected for detailed study, the results are tabulated in table 1.

Of these five cases with chronic subdural hemorrhage three were found to have x-ray evidence of scorbutic changes in the long bones. In the other two cases the history and examination were suggestive of scurvy, though the x-rays exhibited no positive findings.

Hess and Unger<sup>5</sup> have said "It is evident that the fact that beading of the ribs may be of scorbutic origin has clinical and diagnostic significance. Unless we are certain that a baby has received an adequate quantity of antiscorbutic food we are not justified in considering enlargement of the costochondral junctions of rachitic origin. The rosary may indeed be of two fold nature as these two nutritional

disorders may, and frequently do, exist concomitantly." In the two infants without x-ray changes in the long bones, both exhibited costochondral changes and it was fairly certain that they had not received an adequate quantity of antiscorbutic food.

A tabulated comparison of the positive findings in the last two series of cases, reported by Peet and Kahn, and by Sherwood, reveals a strikingly poor social and nutritional background (table 2). Eleven of the eighteen patients were either illegitimate or had been cared for in foster homes, ten were specifically recorded as being artificially fed, and only one was stated to be breast-fed. It is of interest to note that in the case occurring in a breast-fed baby the onset was at thirteen months of age, the latest in both groups. The disease did not occur until the breast feeding had been stopped.

Instances of subdural hemorrhage associated with acute scurvy are not wanting. Gilman and Tanzer<sup>6</sup> have reported a case in a boy of sixteen months who was breast-fed for two months, and then weaned on cow's milk with an inadequate supplement of orange juice. He was operated upon, a clot extracted and recovery ensued. These authors reviewed cases of a similar condition in infants reported by Sammis,<sup>7</sup> Ord,<sup>8</sup> Meyer,<sup>9</sup> Havem,<sup>10</sup> and Sutherland.<sup>11</sup> Sutherland's two cases in 1893 are extremely interesting. They were girls with advanced scurvy, aged two years, and fourteen months, respectively. At autopsy each was found to have extensive subdural hemorrhage, in addition to which one had a soft, red gelatinous material in the spinal canal just beneath the dura, and the other had two subcortical hemorrhages. He concluded that these hemorrhagic lesions were the same as Virchow's pachymeningitis interna hemorrhagica because there was (1) a tendency to recurrent attacks of hemorrhage without local inflammation, (2) coagulation and organization of the extravasated blood, and (3) the effects were entirely those of mechanical pressure. He emphasized that "these conditions are also characteristic of the subperiosteal and other hemorrhages of scurvy."

In addition to these instances the American Pediatric Society's report<sup>12</sup> on infantile scurvy in 1898 set forward three of twenty nine deaths as due to cerebral hemorrhage. The diagnoses were made clinically. Stokes and Campbell<sup>13</sup> reported three fatal cases of infantile scurvy in one of which subdural hemorrhages were

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The term chronic subdural hematoma as used in these pages is synonymous with pachymeningitis interna hemorrhagica of the older writers.

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found at autopsy Hess<sup>14</sup> in 1914 stated, "Finkelstein mentions that hemorrhage (in infantile scurvy) has been found postmortem in the dura mater. In one of our cases in which convulsions supervened in the course of the disease, the blood-tinged cerebrospinal fluid led us to believe that we were dealing with a case of this nature." This is interesting and pertinent, inasmuch as convulsions and bloody cerebrospinal fluid are the most constant findings in chronic subdural hemorrhage, if the clinical signs of advanced scurvy had been overlooked, this case would doubtless have been diagnosed chronic subdural hemorrhage.

#### DISCUSSION

In studying the incidence of chronic subdural hemorrhage as reported by various authors it is at once striking that it occurs primarily in infants, chronic alcoholics, and the insane.<sup>1 2 3 15 16 17</sup>

The particular advantage of studying the entity of chronic subdural hemorrhage in infancy is the relative ease with which the nutritional aspects can be evaluated and the fact that vitamin C deficiency is manifested in the x-ray by pathognomonic bone changes which when present to a sufficiently advanced degree give conclusive objective evidence of the dietary error. We now know that subclinical scurvy may exist before clinical manifestations and x-ray changes become apparent.

In the group of nine infants studied at The Infants' and The Children's Hospital in Boston all were bottle-fed. Case 9 is excluded from this discussion, as it was an instance of birth hemorrhage. Five of the eight remaining patients were cared for in institutions or by foster mothers, and six were specifically recorded to have had rosaries of varying degrees. X-rays of the long bones were available for study in five of these cases, and in three roentgenologic evidence of scurvy was elicited.

It is not to be wondered at that active scurvy could not readily be demonstrated in each patient in this series, since the essence of the conception here set forward, is that of a chronic low grade process. One might say that chronic subdural hemorrhage as encountered clinically and at autopsy is an end stage, far removed from the initial series of events. The scorbutic process itself may have been arrested without obviating the effects of repeated cerebral hemorrhage. It is not unreasonable to assume that close scrutiny of the dietary of the alcoholic and the insane would often reveal deficiency of vitamin C, a finding so much more subject to objective proof in early life. Ascorbic acid levels in the blood, and urine studies for the determination of the degree of saturation with the vitamin offer new methods of investigating latent scurvy.

That these three groups of individuals are subject to relatively frequent head trauma is an observation that needs no carefully adduced evidence. It is more pertinent to point out that histories of such patients are often of necessity inaccurate, and completely obscured in this respect. That a smaller increment of trauma is necessary to produce bleeding when added to a "hemorrhagic diathesis" is also obvious.

In chronic subdural hemorrhage the source of the bleeding is usually regarded as a seepage following the rupture of bridging veins" between the pia and dura mater.<sup>17 18</sup> Another plausible explanation could be hemorrhage from minute bleeding points where arachnoid villi were torn away at their invaginations into the dural sinuses. In vitamin C deficiency with its consequent resorption of intercellular substance, the security of the arachnoid villi must suffer along with other structures dependent upon connective tissue support. Wolbach<sup>20</sup> has observed, "The arachnoid villi because of their structure and relationship to compressible veins and sinuses furnish yielding points in the encasement of the brain," and "form the weakest points in the dura."

The fate of blood in the subdural space in healthy individuals has been investigated by Van Vleuten,<sup>21</sup> Boeckmann,<sup>22</sup> and Putnam and Putnam.<sup>23</sup> These workers were agreed that, in the natural course of events, subdural blood was subject to resorption and organization. Putnam and Putnam state that "the subdural clots in our cases were always small and never showed evidence of progressive or repeated hemorrhage." These were substantially the same findings they obtained in experimental animals. This is not the state of affairs in chronic subdural hematoma where there is a progressive series of hemorrhages, without effective organization. Some factor not already considered in previous clinical or experimental conceptions of chronic subdural hemorrhage must be of importance. That the factor may be scurvy is indicated by the clinical, sociologic and epidemiologic considerations enumerated above.

Wolbach<sup>24</sup> has stressed the importance of vitamin C in repair. Thus the very condition which might well account for easy bleeding into the subdural space, would also be the one in which organization and resorption of extravasated blood would be most difficult. This is in accord with the progressive nature of chronic subdural hematoma. In his study on the formation of collagen and reticulum Wolbach has shown that repair of the blood clot in absolute scorbutus begins promptly by the migration of fibroblasts from adjacent tissues into the clot and the continued division of these cells. Capillaries do not penetrate the clot for any considerable distance, and although closed columns of endothelial cells grow into it they are apparently unable, due to







lack of intercellular substance, to form functioning capillaries. Such a situation could serve to give rise to a fibrous vascular zone, in short a neomembrane, without adequate organization of the interior. Progressive hemorrhages and progressive remissions and exacerbations of a scorbutic process could account for all the variations of the velvety membrane found at autopsy. Zollinger and Gross<sup>19</sup> have demonstrated that this structure has the properties of a semipermeable membrane. It is well known that encysted collections of erythrocytes may remain intact for a long period of time, and that it may be a matter of months before complete disintegration of red cells with liberation of free hemoglobin from their stroma is gradually accomplished. These workers found the osmotic pressure of whole blood one-fifth that of hemolyzed blood. Furthermore, since osmotic pressure is directly proportional to the molecular concentration of a fluid, they concluded that "disintegration of hemoglobin to a certain point is attended by an enormous rise in osmotic tension." Such a conception in their opinion could account for the slow addition of fluid and enlargement of the hematoma sac to two or three times its original size. The slow augmentation in size would account for the late onset of symptoms in this condition.

## SUMMARY

Chronic subdural hematoma occurs primarily in the infant, the alcoholic, and the insane. On several occasions subdural hemorrhage has been conclusively demonstrated as a complication of scorbutus. A closer analysis of five of the "idiopathic" cases of chronic subdural hemorrhage observed in this hospital has been attempted. In three of them, x-ray evidence of scorbutic bone changes was found. The epidemiologic and sociologic implications of existing data in this regard have been emphasized.

The following sequence of events seems to be concerned with the production of idiopathic chronic subdural hematoma: an underlying bleeding diathesis is postulated in most cases on the basis of scurvy. Free subdural bleeding is produced by a definite or insignificant head trauma causing either disruption of arachnoid invaginations into the dural sinuses, or rupture of a bridging vein. Organization and removal of the clot are impeded by the scorbutic process resulting in a neomembrane surrounding free blood. Repeated trauma and remission and exacerbation of the scurvy modify the disease. Late

symptomatology is occasioned by enlargement of the semipermeable sac following the slow breakdown of red blood cells and reduction of free hemoglobin into smaller molecular aggregates with the passage of time.

## CONCLUSION

The role of scurvy in the etiology of chronic subdural hematoma is emphasized.

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## BRUCELLOSIS (UNDULANT FEVER)

Interesting and Important Facts About the Disease With the Report  
of a Severe Case Occurring in a Boston Physician

BY JOHN F. CASEY, M.D.\*

A RECENT letter to the doctors of Massachusetts from Dr. Henry D. Chadwick, Commissioner of Public Health,<sup>1</sup> calls attention to the increase of undulant fever in Massachusetts. During 1935, 42 cases were reported in the State, 1 of which was fatal.

For about ten years, this disease has been present in the western and southern parts of this country, but New England has been comparatively free from it. The disease has been reportable in Massachusetts only since 1930.

In 1930, 6 cases were reported, in 1931, 15 cases, in 1932, 15 cases, in 1933, 11 cases, and in 1934, 15 cases. The increase of reported cases from 15 in 1934 to 42 in 1935 is probably due to an increase in the incidence of the disease, for the annual report of the Massachusetts Department of Public Health for the year ending November 30, 1934 states that the incidence of contagious abortion among the dairy cattle of the State was very high. It is possible, however, that there are many undiagnosed cases in the State for the symptoms are many and varied.

Having cared for a medical colleague through a severe infection with *Brucella abortus*, lasting from the end of May to September, it seems important to call the attention of the New England physicians to the various aspects of this disease which may cause such serious illness and great economic loss.

For years, this disease has been known by various names,—Malta fever, Mediterranean fever, and undulant fever are a few. Recently, both in this country and abroad, the name *brucellosis* has been adopted. The disease was first limited to the Island of Malta and neighboring islands, but has gradually spread throughout Europe and America.

**Historical.** In 1887, David Bruce,<sup>2</sup> visiting Malta on his honeymoon, became so much interested in the disease that, calling on his wife to help him, he attacked the bacteriologic problem. From the spleens of soldiers, who had died of the disease, he grew a micrococcus, the *Micrococcus melitensis*. Mosquitoes, flies, fleas, the water supply and foodstuffs were investigated. Attention was finally focused on the goats which supply most of the milk on the Island of Malta. Bruce showed that 50 per cent of the goats were infected and proved that the disease was transmitted through their milk. From this medical

pioneering of the Colonel and his lady, we get the name, *brucellosis*.

About ten years after Bruce had discovered the *Micrococcus melitensis*, a Danish veterinarian, Bang, discovered the organism causing contagious abortion in cows, and named it *Bacillus abortus*.

In 1917 Alice Evans, a young bacteriologist in the United States Department of Agriculture, discovered the close relationship between the *Micrococcus melitensis* of Malta fever and the *Bacillus abortus* found in the milk of American herds. Later the generic name of *brucella* was given to the group.

In 1924 Keefer<sup>3</sup> reported the first human *brucellosis* case in this country. Since that time the disease has been found in every part of this country, but particularly in the great cattle raising states.

**Clinical Types of the Disease.** There are acute, mild and severe, types, and also a chronic type. The acute type may become chronic. In various parts of the country, there are patients who have been ill for over a year with the disease.

**Incubation Period.** From all available data, it appears to be two weeks, although there is some evidence that the disease may occur as early as one week after exposure.

**Symptoms.** In acute *brucellosis*, the usual symptoms are fever, chills, drenching sweats, severe constipation, abdominal discomfort, arthritic and neuritic pains, nausea, occasional vomiting, and loss of appetite with resulting great loss of weight and strength. A mousey odor may be detected about the patient but this is more often noticed by the patient himself.

In the chronic form, exhaustion, insomnia, irritability, and aches and pains for which no objective causes can be found form the common picture.

**Physical Signs.** The physical signs offer little aid in diagnosis. There are often no signs except those due to fever and anemia. When the disease has been present for some time, emaciation may be marked. The spleen is frequently enlarged, occasionally the liver.

**Diagnosis.** In any continued fever without localizing signs think of *brucellosis*, and have a blood examination. Typhoid fever, tuberculosis, rheumatism, influenza, subacute bacterial endocarditis, malaria, and neurasthenia are some of

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the diagnoses erroneously made. Sidel and Segal<sup>7</sup> report two cases in *The New England Journal of Medicine* in which the diagnosis at first in one case was subacute bacterial endocarditis, in the other pulmonary tuberculosis.

Subacute bacterial endocarditis, however, may be due to the brucella organism. Angle<sup>8</sup> has reported 100 cases of brucellosis with two deaths, both from a complicating subacute bacterial endocarditis in which brucella was shown to be the etiologic organism.

It is important to know that brucella may be the cause of meningitis. Sanders in 1931 reported a fatal case with recovery of the organism from the spinal fluid. Poston and Smith<sup>4</sup> have recently reported two cases that recovered, and have reviewed the literature.

In brucella meningitis, the usual signs of meningitis are present, the spinal fluid is under pressure, is turbid, and shows a cell count of 500 to 1,000, mostly polymorphonuclear leukocytes. The brucella may be cultured from the spinal fluid by a special method used by Poston and Smith.

Hartley and co-workers<sup>9</sup> report a case in which they were unable to grow the organism from the spinal fluid but recovered it after guinea-pig inoculation.

In a recent article Alice Evans<sup>10</sup> calls attention to obscure types of brucellosis. The literature preceding this article contains little about the chronic form of the disease. It is not surprising that these cases that rarely run a noticeable temperature over months of illness and that complain of exhaustion, insomnia, irritability and indefinite aches and pains for which no localizing signs are found, are often diagnosed as neurasthenia.

Hardy, Jordan and Boits<sup>11</sup> in a paper read at the last American Medical Association meeting, present a complete study on 705 cases occurring in the State of Iowa in the last six years. Their study reveals that the organism has been the cause of many and varied medical and surgical conditions, such as chronic abscesses, osteomyelitis, pleural effusion, endocarditis, pericarditis, arthritis, spondylitis and meningitis.

**Laboratory Aids in Diagnosis.** The agglutination test is of great value, but too much reliance must not be placed upon it. Blood is taken as for a Wassermann test and sent to the State Department of Public Health Laboratory. Many men have felt that when the test is reported positive in dilutions of 1 to 40 or 1 to 50 it was not significant as in these strengths, agglutination, at times takes place with the serum of patients suffering from other fevers. One to 80 or higher dilutions were regarded as necessary for a diagnosis.

Even this is misleading, however for it is

now known that brucellosis may be the correct diagnosis even if the agglutination test is positive only in low dilution or, at times when the agglutination test is negative.

Harris<sup>12</sup> reports 75 cases of chronic brucellosis that he has observed. Eleven of these had repeated negative agglutination tests although the other evidence proved them undoubted brucellosis cases.

The skin test has proved very useful. Two to four hundredths cc of brucella antigen (any of the brucella vaccines on the market may be used) is injected intradermally. At the same time a normal person is injected. The antigen usually produces a tuberculin-like reaction in the patient within eight hours that persists for twenty-four to forty-eight hours, whereas little or no reaction is observed in the control.

Blood cultures are not of value for quick diagnosis. Special media must be used. The organism is slow to grow. Cultures should not be reported negative until they have been observed for thirty days. There are many different strains of the brucella organism and special media and bacteriologic technique are needed to grow and identify the various strains.

The blood shows a secondary anemia, and a leucopenia is usually found by the time the patient is seen although there is an early leucocytosis.

**CASE REPORT.** A Boston specialist of 40 had a slight chill following a golf game on May 17, 1935. He felt well that night and the following day continued at work but in the afternoon felt flushed and was found to have a temperature of 100.4°. From that time until August 2 he had a fever some part of each day.

**Past History.** He had always enjoyed good health except for a severe influenza pneumonia in 1918.

**Physical Signs.** At the onset of the disease he was an exceptionally healthy and well-developed individual. He was normal in every particular except for a moderately coated tongue. Later in the disease the only signs he showed were those due to fever and loss of weight. At no time was any enlargement of the spleen or liver demonstrated.

**Progress of the Disease.** During the first few days he felt perfectly well most of the time and was up and about. But in the afternoons he felt chilly and then his temperature rose to 100° or 100.6° and was followed during the evening by a moderate sweat. When this had occurred for three successive days and no focus of disease was apparent he was asked to report to the hospital for complete study.

X-ray of the teeth showed nothing abnormal. Heart x-ray was normal. X-ray of the lungs disclosed a moderate shadow at the right base. This was the site of his old pneumonia. It was important to know this for at first it was thought that this might be a new process and the cause of his present illness.

Laboratory work showed the following: Hg 83 per cent, RBC 4,320,000, WBC 16,800, Polys 73 per cent. Blood culture sterile. Blood smears showed no malaria parasites. Blood was sent to the State Laboratory for the agglutination test for undulant fever and to the United States Public Health Laboratory for tests for undulant fever and tularemia. The tularemia test was negative but the

serum gave complete agglutination of *Bacillus abortus* in dilution of 1 640 and later, on June 1, 1 1280

We made several attempts to grow the organism from the blood but were unsuccessful

The white blood counts were interesting showing the early leucocytosis with rapidly developing leucopenia, and the increase in leucocytes due to foreign protein

May 26	16,800	
May 28	13,600	
May 29	10,800	
June 2	7,200	
June 3	6,700	
June 5 a m	6,000	Before serum
June 5 p m	7,500	Serum given June 5 6 7
June 6	10,600	
June 9	10,250	
June 10	12,600	
July 11	6,400	After relapse
July 17	11,800	Daily injections of liver given since July 11

Urine Several examinations, sp gr 1.012, alb 0 sugar 0, sediment, negative

A skin test was done with killed brucella organisms and was positive, one done on a control was negative

The patient left the hospital on June 11 and went to the beach. He remained in bed most of the time but spent part of the day out-of-doors walking about. Each day he felt well, but at night he had a slight fever and a moderate sweat. On July 4 he had a severe chill followed by a temperature of 103° and later a drenching sweat. He was then more severely ill than at any time in the disease. He had continual nausea vomiting at times, no appetite, great abdominal discomfort, severe constipation and a neuralgic pain in back of one eye. He continued severely ill until July 14 when his symptoms began to abate. During this period he had one sweat lasting 5 hours. He had lost weight rapidly, at the low point of his illness having lost 50 pounds. He improved gradually having a fever some part of every day until August 2 when the fever ceased abruptly. From that time on he improved rapidly. He returned to work on September 3 still about 30 pounds under his usual weight. By January 1936 he had regained his lost weight and has been in excellent health since.

**Treatment** As in all diseases in which no proved specific has been discovered, the number of remedies are multiple. In our case we had two medications which we thought of value. From the start of the disease, the patient took from 40 to 60 grains of acetylsalicylic acid a day. We felt that this added to his comfort, and when the amount of the medication was cut down he began to suffer from joint and muscle pains. At times, the medication was omitted because the patient felt that it caused his sweats to be more profuse.

Hoping to prevent the usual anemia present in the disease, we gave frequent intramuscular injections of liver. It seemed to be of value. The low point of the blood was a hemoglobin of 74 per cent and a red blood cell count of 3 760 000.

We had many advisers in regard to specific therapy, and elected to use an antiserum prepared by Foshay<sup>12</sup> and his associates of the Uni-

versity of Cincinnati. This serum was obtained from goats after subcutaneous inoculations with chemically treated suspensions of brucellae. In view of the fact that the last dose of serum was given on June 7 and the fever did not terminate until August 2, we feel that either our dosage was not sufficient or that the serum was without value. We are inclined to think that the dosage was insufficient, since the patient showed a decided improvement following the use of the serum, but suffered a relapse on July 4.

Bannick and Magath<sup>14</sup> of the Mayo Clinic recently reported two cases treated with the Foshay serum. They feel that the serum was of definite value in these cases. At the time of treating our case the serum was obtained from goats. Foshay now uses horses instead and considers the serum more potent.

Many men who have treated a great number of cases, both in this country and abroad, feel that a brucella vaccine is of great value. Several commercial houses have a vaccine on the market prepared according to the method of Simpson. It is widely used. Angle, who has developed his own vaccine, speaking of vaccine therapy says, "I am convinced that it is the best single therapeutic agent now available." The vaccine causes a severe reaction. This is both a pronounced local and general reaction. It is so severe that the use of vaccine is contraindicated in elderly individuals.

The latest form of treatment reported is the production of hyperpyrexia by means of the Simpson-Kettering hypertherm. Prickman and Popp<sup>15</sup> of the Mayo Clinic report three cases treated in this manner with good results. In their opinion the results justify a further trial of this method.

Because of the varied length of illness in brucellosis and because of the frequent abrupt termination of the illness in many cases, no matter what form of therapy is used, it is difficult to evaluate the various forms of treatment.

**Source of Infection in Our Case** The question most often asked about our case was, "Where did he get the disease?" The patient had not been outside of Massachusetts for several months. There were no known cases in Boston or vicinity. He used only pasteurized milk and cream in his home, and it was unusual for him to drink milk. In spite of careful investigation by the State Department of Public Health, the source of his infection was not determined.

**Comment** The disease brucellosis is a severe disease of long duration. It may involve almost any part of the body, in this respect resembling tuberculosis and syphilis. Pasteurization of milk would eliminate the source of most of the brucellosis in this country. We of Massachu-

setts are fortunate in that 85 per cent of the population of our state is protected by the use of pasteurized milk.

It might be well, however, to call attention to the fact that some areas are not protected, to mention one, our island of Nantucket, where raw milk is commonly used

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## MILK MODIFICATION AND INFANT CONSTITUTION\*

BY I NEWTON KUGELMASS, M D I

MILK constitutes the basis of formulas for infants' feedings. Proper choice of the milk suited to the particular infant is indispensable in successful infant nutrition. The great variety of milks available make such a choice difficult in the individual infant because of unnecessary empiricism in practice. More stress has been placed upon the various milks and their properties than on infants and their tolerance. Nutritional knowledge has advanced sufficiently to adapt effectively the required type of milk to the individual infant rather than the infant to the milk.

The type of milk selected requires modification, the procedure of choice depending upon the infant. The resulting formula may meet all the nutritional needs of the infant and yet be unsuited to his digestive tolerance. The theoretical goal in nutrition is the same for all infants but the methods of attaining it necessarily differ with each infant. Goal and method are not only necessary but inseparable in effective infant feeding. Thus, there can be no single formula for the universal feeding of infants. The percentage composition of cow's milk mixtures, imitating breast milk, becomes less important than the behavior in the infant's stomach. We have studied the response of various methods of feeding in terms of the infant's constitution as a more physiologic basis for determining the type of formula indicated.

## PLAN OF INFANT FEEDING STUDY

Comparative studies of "standard formulas" prepared from various types of milk were made

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on infants during the first three months of life. The newborns on the service were maintained from birth with the hydrating solution given at two-hour intervals throughout the twenty-four hour cycle and put on the formula under study on the second day of life. An effort was made in each case to have the infant nurse and the breast-fed infants were used as controls. Despite the willingness of most mothers to nurse their babies and our insistence in favor of breast feeding, fewer infants were nursed than is considered good practice. Although theoretically tuberculosis in the mother is the only contradiction to nursing, actually we have found severe postpartum disturbances affecting the mother physically and temperamentally to an extent that made nursing very trying. Breast pumps were tolerated for short periods and manual stripping was rejected by many mothers. Whatever the maternal condition, the baby was weaned if the quantity of breast milk was less than an average of two ounces per feeding after the first fortnight.

Weaning during the newborn period was instituted for very definite indications and not for the purpose of these studies. Many of the infants, included in the data, nursed for a number of days during which time the intake of the special formula was relatively small. But during the baby's stay in the nursery the intake of the milk mixture was gradually increased until the formula under study comprised the total day's feeding. The infants' progress was also under the supervision of the research dietitian, Miss McMahon and the technical data under Miss Pugslev, research chemist, both devoting full time to these nutritional studies.

Over fifty well newborns were observed serially on each formula of fresh, powdered, evaporated

orated and acid milks\* with breast milk as the control. Careful records were made of the physical status and functional response to the particular feeding. This was continued at home after the babies were discharged from the nursery and observed subsequently at weekly intervals in a well-baby unit where clinical and laboratory examinations were made. Those infants whose mothers failed to keep appointments were followed up at home by one of the dietitians. The mother was provided with the special milk used for the infant's formula thus insuring constancy of product and of cooperation. Only normal, well infants were included in this series. It is the first three months of the feeding progress of these infants that concerns this report.

ROUTINE FEEDING OF "STANDARD" FORMULAS IN WELL INFANTS

I Control Series. Fifty-five normal infants were maintained exclusively on breast milk for three months. The breast feeding was started five hours after birth in newborns with a birth weight over six pounds. Although five of these newborns had difficult deliveries they showed no postnatal manifestations. Orange juice and cod liver oil were introduced the third week. The orange juice was first given half strength and gradually increased so that two ounces were given by the end of the first month. The 10 D cod liver oil\* was given five drops a day increasing it gradually until each infant received one teaspoonful a day. The average volume intake was 3.8 ounces per feeding during the first month, subsequent amounts not being determined. Indeed it was difficult to obtain a sufficient number of weighings during the first month to estimate the average volume intake, the accuracy is therefore indeterminate for comparison with the equivalent values for artificial feedings. The average volume intake consumed during the twenty-four hour cycle was, accordingly, 22 ounces. The average caloric intake was about 56 calories per pound per day. The average gain in weight was 6.9 ounces per week and the average gain in height 1 inch per month. The average number of stools was 2.5 per day. Three of the infants developed transient upper respiratory infections, four had alimentary disturbances, that is, one vomited, one had colic and two developed diarrhea.

Series II Whole Milk Formula. Fifty-four normal infants were maintained on a whole milk mixture for three months. It consisted of boiled whole milk with 10 per cent added carbohydrate. The formula was started the second day of life in well newborns with a birth weight over six pounds. Although seven of the group studied had difficult deliveries there were no postnatal

manifestations. Orange juice and cod liver oil were introduced the third week. The orange juice was first given half strength and increased gradually so that two ounces were given by the end of the first month. The 10 D cod liver oil was offered five drops a day increasing it gradually until the infant received one teaspoonful a day. The formula was made up for twenty-four hours and divided into six feedings given at four-hour intervals during the first month and subsequently into five feedings. The amount offered at each feeding was slightly above that usually taken by infants at each age level.

The average volume consumed by an infant was 4.0 ounces per feeding during the first month, 5.2 during the second and 6.0 during the third month, the average volume for the total day's feeding being 24, 26 and 30 ounces respectively. The average caloric intake was about 60 calories per pound per day. The average gain in weight was 6.0 ounces per week and the gain in height was 1 inch per month. The average number of stools was 3.3 per day. There were three cases of upper respiratory infection, one funiculosis and one pyelitis. But thirteen infants showed other disturbances, that is three vomited, three had colic, one had diarrhea, four were severely constipated, one developed eczema and one had pyloric stenosis.

The distribution of alimentary upsets was not uniform at each age level, the greatest proportion being during the first month and the least during the third month. 36 per cent during the first month, 24 per cent during the second and 11 per cent during the third month with an average of 24 per cent for the entire period. Several infants with limited digestive capacities were eliminated from this study during the first month. The most striking feature was the correlation between alimentary tolerance and body build. About 80 per cent who showed digestive disturbances were of the lateral type. Apparently the majority of normal infants of linear body build are able to take undiluted boiled whole milk in amounts adequate to satisfy the appetite without revealing intestinal disturbances.

Series III Diluted Milk Formula. Fifty-nine normal infants were maintained on a diluted milk formula for three months. It consisted of boiled half strength milk with 10 per cent added carbohydrate. The formula was started the second day of life in well newborns with a birth weight over 6 pounds. Although three of the group studied had difficult deliveries there were no postnatal manifestations. Orange juice and cod liver oil were introduced the third week. The orange juice was first given half strength and increased gradually so that 2 ounces were given by the end of the first month. The 10 D cod liver oil was offered five drops a day increasing it gradually until the infant re-

\*supplied through the courtesy of Merck Johnson & Company  
1 1935

ceived one teaspoonful a day. The formula was made up for twenty-four hours and divided into six feedings given at four-hour intervals during the first month and subsequently into five feedings. The amount offered at each feeding was slightly above that usually taken by infants at each age level.

The average volume consumed per infant was 4.2 ounces per feeding during the first month, 5.4 during the second and 6.3 during the third month, the average volume for the total day's feeding being 25, 27 and 32 ounces respectively. The average caloric intake was about 52 calories per pound per day. The average gain in weight was 5.9 ounces per week and the average gain in height was one inch per month. The average number of stools was 2.5 per day. There were three cases of upper respiratory infection, six cases of alimentary disturbances, i.e., three vomited, two developed colic and one had diarrhea. The distribution of alimentary upsets was not uniform but in the opposite sense of the group on whole milk formulas. There appeared a somewhat greater number of disturbances during the second and third months than during the first. Apparently dilution does not spare infants intestinal disturbances after the first month.

**Series IV *Evaporated Milk Formula*** Fifty-eight normal infants were maintained on an evaporated milk formula for three months. It consisted of evaporated milk, 1 to 2 dilution, with 10 per cent added carbohydrate. The formula was started the second day of life in well newborns with a birth weight over 6 pounds. Although six of the group studied had difficult deliveries there were no postnatal manifestations. Orange juice and cod liver oil were introduced the third week. The orange juice was first given half strength and increased gradually so that 2 ounces were given by the end of the first month. The 10 D cod liver oil was offered 5 drops a day increasing it gradually until the infant received 1 teaspoonful a day. The formula was made up for twenty-four hours and divided into 6 feedings given at four hour intervals during the first month and subsequently into five feedings. The amount offered at each feeding was slightly above that usually taken by infants at each age level.

The average volume consumed per infant was 4.5 ounces per feeding during the first month, 5.0 during the second and 6.3 during the third month, the average volume for the total day's feeding being 25, 25 and 30 ounces respectively. The average caloric intake was about 66 calories per pound per day. The average gain in weight was 7.1 ounces per week and the average gain in height was one inch per month. The average number of stools was 2.6 per day. There were four cases of upper respiratory in-

fection. Five developed alimentary disturbances, that is, two vomited, one had colic, one diarrhea and one vomited associated with asthma.

**Series V *Powdered Milk Formula*** Sixty normal infants were maintained on a powdered milk formula for three months. It consisted of powdered milk, 1 tablespoonful to 2 ounces of water, with 10 per cent added carbohydrate. The formula was started the second day of life in well newborns with a birth weight over 6 pounds. Although five of the group studied had difficult deliveries there were no postnatal manifestations. Orange juice and cod liver oil were introduced the third week. The orange juice was first given half strength and increased gradually so that 2 ounces were given by the end of the first month. The 10 D cod liver oil was offered 5 drops a day increasing it gradually until the infant received 1 teaspoonful a day. The formula was made up for twenty-four hours and divided into six feedings given at four-hour intervals during the first month and subsequently into five feedings. The amount offered at each feeding was slightly above that usually taken by infants at each age level.

The average volume consumed per infant was 4.1 ounces per feeding during the first month, 5.1 during the second and 5.9 during the third month, the average volume for the total day's feeding being 24, 26 and 29 ounces respectively. The average caloric intake was about 60 calories per pound per day. The average gain in weight was 6.4 ounces per week and the average gain in height was one inch per month. The average number of stools was 2.4 per day. There were five cases of upper respiratory infection including one with otitis media. Five developed alimentary disturbances that is, two vomited, one had colic, three developed diarrhea, one of which was secondary to an upper respiratory infection.

**Series VI *Acid Milk Formula*** Fifty-six normal infants were maintained on powdered lactic acid milk formula for three months. It consisted of 1 tablespoonful of the powder to 2 ounces of water, with 10 per cent added carbohydrate. The formula was started the second day of life in well newborns with a birth weight over 6 pounds. Although seven of the group studied had difficult deliveries there were no postnatal manifestations. Orange juice and cod liver oil were introduced the third week. The orange juice was first given half strength and increased gradually so that 2 ounces were given by the end of the first month. The 10 D cod liver oil was offered 5 drops a day increasing it gradually until the infant received 1 teaspoonful a day. The formula was made up for twenty-four hours and divided into six feedings given at four hour intervals during the first month and subsequently into five feedings.

oated and acid milks\* with breast milk as the control. Careful records were made of the physical status and functional response to the particular feeding. This was continued at home after the babies were discharged from the nursery and observed subsequently at weekly intervals in a well-baby unit where clinical and laboratory examinations were made. Those infants whose mothers failed to keep appointments were followed up at home by one of the dietitians. The mother was provided with the special milk used for the infant's formula thus insuring constancy of product and of cooperation. Only normal, well infants were included in this series. It is the first three months of the feeding progress of these infants that concerns this report.

#### ROUTINE FEEDING OF "STANDARD" FORMULAS IN WELL INFANTS

**I Control Series** Fifty-five normal infants were maintained exclusively on breast milk for three months. The breast feeding was started five hours after birth in newborns with a birth weight over six pounds. Although five of these newborns had difficult deliveries they showed no postnatal manifestations. Orange juice and cod liver oil were introduced the third week. The orange juice was first given half strength and gradually increased so that two ounces were given by the end of the first month. The 10 D cod liver oil\* was given five drops a day increasing it gradually until each infant received one teaspoonful a day. The average volume intake was 3.8 ounces per feeding during the first month, subsequent amounts not being determined. Indeed it was difficult to obtain a sufficient number of weighings during the first month to estimate the average volume intake, the accuracy is therefore indeterminate for comparison with the equivalent values for artificial feedings. The average volume intake consumed during the twenty-four hour cycle was, accordingly, 22 ounces. The average caloric intake was about 56 calories per pound per day. The average gain in weight was 6.9 ounces per week and the average gain in height 1 inch per month. The average number of stools was 2.5 per day. Three of the infants developed transient upper respiratory infections, four had alimentary disturbances, that is, one vomited, one had colic and two developed diarrhea.

**Series II Whole Milk Formula** Fifty-four normal infants were maintained on a whole milk mixture for three months. It consisted of boiled whole milk with 10 per cent added carbohydrate. The formula was started the second day of life in well newborns with a birth weight over six pounds. Although seven of the group studied had difficult deliveries there were no postnatal

manifestations. Orange juice and cod liver oil were introduced the third week. The orange juice was first given half strength and increased gradually so that two ounces were given by the end of the first month. The 10 D cod liver oil was offered five drops a day increasing it gradually until the infant received one teaspoonful a day. The formula was made up for twenty-four hours and divided into six feedings given at four hour intervals during the first month and subsequently into five feedings. The amount offered at each feeding was slightly above that usually taken by infants at each age level.

The average volume consumed by an infant was 4.0 ounces per feeding during the first month, 5.2 during the second and 6.0 during the third month, the average volume for the total day's feeding being 24, 26 and 30 ounces respectively. The average caloric intake was about 60 calories per pound per day. The average gain in weight was 6.0 ounces per week and the gain in height was 1 inch per month. The average number of stools was 3.3 per day. There were three cases of upper respiratory infection, one furunculosis and one pyelitis. But thirteen infants showed other disturbances, that is three vomited, three had colic, one had diarrhea, four were severely constipated, one developed eczema and one had pyloric stenosis.

The distribution of alimentary upsets was not uniform at each age level, the greatest proportion being during the first month and the least during the third month. 36 per cent during the first month, 24 per cent during the second and 11 per cent during the third month with an average of 24 per cent for the entire period. Several infants with limited digestive capacities were eliminated from this study during the first month. The most striking feature was the correlation between alimentary tolerance and body build. About 80 per cent who showed digestive disturbances were of the lateral type. Apparently the majority of normal infants of linear body build are able to take undiluted boiled whole milk in amounts adequate to satisfy the appetite without revealing intestinal disturbances.

**Series III Diluted Milk Formula** Fifty-nine normal infants were maintained on a diluted milk formula for three months. It consisted of boiled half-strength milk with 10 per cent added carbohydrate. The formula was started the second day of life in well newborns with a birth weight over 6 pounds. Although three of the group studied had difficult deliveries there were no postnatal manifestations. Orange juice and cod liver oil were introduced the third week. The orange juice was first given half strength and increased gradually so that 2 ounces were given by the end of the first month. The 10 D cod liver oil was offered five drops a day increasing it gradually until the infant re-

\*Supplied through the courtesy of Mead Johnson & Company.



twenty-four hours and divided into six feedings given at four-hour intervals during the first month and subsequently into five feedings. The amount offered at each feeding was slightly above that usually taken by infants at each age level.

The average volume consumed per infant was 4.4 ounces per feeding during the first month, 5.5 during the second and 6.5 during the third month, the average volume for the total day's feedings being 26, 27 and 30 ounces respectively. The average caloric intake was about 70 calories per pound per day. The average gain in weight was 7.3 ounces per week and the average gain in height one inch per month. The average number of stools was 2.6 per day. There were four cases of mild upper respiratory infection and one infant vomited.

#### EVALUATION OF RESULTS WITH ROUTINE AND INDIVIDUALIZED FEEDING

I *Comparative Intake of Formulas* The ingestion of various types of formulas was relatively uniform in amount for each group studied. During the first month the infants on breast milk took such varied amounts at each feeding that the average volume intake is of little significance in comparison with artificial feeding. Apparently the effort exerted in nursing is more of a factor than appetite in determining the volume intake at a feeding. The placid role of infants on artificial feeding accounts for the relatively uniform intake on the various types of prescribed formulas.

Infants took less of the acid formula during the first month but, once they became adapted to it, they took more of that formula than of the others. During the entire period of study infants took more of processed milk formulas than of the whole milk formula. And those on individualized feedings consumed more per feeding as well as for the twenty-four hour cycle. This is partly due to the fact that more infants were included in the series who have taken feedings steadily without alimentary upsets. The caloric intake per pound of body weight per twenty-four hours was greater on the more concentrated feedings, the least being with the diluted milk mixtures and the most with the acid and individualized formulas.

II *Comparative Tolerance of Formulas* Food tolerance is estimated clinically without quantitative criteria. It is difficult to make comparative estimates of the relative degrees of tolerance for the formulas tested. Quantitatively an infant's tolerance for a food represents the ratio of the maximum amount of the food he can metabolize without resultant disturbances by the maximum amount of that food metabolized by a normal infant of the same age group. We must necessarily deal with max-

imum rather than with optimum intake in the consideration of tolerance because we do not know what the optimum of any food is quantitatively for any infant. But we do know that there is a wide range between the minimum and the maximum and that any attempt to exceed the maximum produced a variety of disturbances essentially alimentary in nature. We are, therefore, led to the evaluation of tolerance of various formulas by a negative qualitative method of procedure. Those formulas consumed in the required amounts were considered well tolerated if they produced no untoward symptoms while those which produced digestive disturbances apparently exceeded the digestive capacities of the infants and were considered poorly tolerated.

All types of formulas were well tolerated excepting the whole milk mixture during the first month. There were the least number of digestive upsets on the individualized formulas and on the breast feeding throughout the feeding period studied. There were fewer digestive disturbances on breast feeding than on fresh milk formulas. Only significant symptoms of digestive disturbances were included in this evaluation of tolerance for much of the minor symptomatology was more an expression of mismanagement than of misfeeding. However a feature that is frequently neglected in relation to food tolerance during the first three months of life is the increased nerve tone of infants in both breast and bottle feeding. It is usually alleviated by transient modification of the feeding quantitatively or qualitatively rather than by resorting to sedatives. The number and quality of the stools were not considered diagnostic of the normal range of alimentary function although frequency or abnormal character of stools was deemed pathognomonic of gastrointestinal disturbance.

A striking feature of the two groups on the fresh milk mixtures was the relation between milk tolerance and body build in well infants. During the first two months there was a relatively great preponderance of digestive disturbances among those infants who were maintained on the whole milk formulas. Eighty per cent of those infants were of the lateral body build. Most of the linear type infants tolerated whole milk mixtures without any disturbances. Apart from food tolerance the caloric requirement from body surface considerations indicates that the linear infants require about 70 calories per pound of body weight while the lateral infants require about 55 calories. This difference in energy requirement appears to parallel their difference in tolerance. It is curious that the high gastric acidity during the first week of life should not increase the digestive capacities of all infants sufficiently to enable them to tolerate whole milk.

The amount offered at each feeding was slightly above that usually taken by infants at each age level

The average volume consumed by each infant was 3.8 ounces per feeding during the first month, 5.3 during the second and 6.2 during the third month, the average volume for the total day's feeding being 22, 26, and 31 ounces per pound per day. The acid feedings were taken with more avidity after the first month. The average caloric intake was about 67 calories per pound per day. The average gain in weight was 7.1 ounces per week and the average gain in height was one inch per month. The average number of stools was 2.7 per day. There were three cases of upper respiratory infection. Five infants developed alimentary disturbances, that is, one vomited, two had colic, two diarrhea and the feedings were reduced.

#### INDIVIDUAL FEEDING OF "STANDARD" FORMULAS IN WELL INFANTS

Every type of formula tested was effective routinely in over 80 per cent of the infants studied. But in each group there were always a number of nonconformists. The particular formula was not adapted to them and they reacted with alimentary offense. Even mother's milk yielded its quota of digestive intolerance. The difficulty is with the infant in each group and not with any of the formulas tested. It appears improbable that any one type of feeding will ever be universally applicable to all infants.

The five series of routine formula feedings separated the normal infants from those with latent constitutional disorders. And even among the large group of normal infants in each series there were differences in the relative tolerance for milk as the first "solid" food. The range of digestive tolerance is so wide in most infants that no abnormal responses are manifest clinically with modified milk mixtures. But in infants with latent constitutional disorders—developmental, allergic, neuropathic—there is either a low digestive capacity for any food or a diminished tolerance for cow's milk frequently below maintenance requirement. Not all these infants rebel against "standard" formulas because the infant's functional deviations may be slow in becoming manifest.

But the constitutional stigmata persist although not always poignantly. The routine feedings unsuited to these infants may tide them over the first months of difficult adjustment but subsequently contribute to the precipitation of their constitutional disease. What may develop will appear more violently if irritated by inappropriate feedings from birth. The feeding of routine formulas to well infants from birth ignores the prevalence of latent constitutional disturbances. Many of these can be

recognized early and an appropriate formula adapted to their more limited digestive capacities.

We attempted to distinguish normal from diathetic newborns to determine the type of milk indicated for each infant individually. Infants with overt disturbances were excluded from this study. Of the forty-five infants with diatheses, 65 per cent were allergic, 30 per cent neuropathic and 5 per cent developmental in origin. The infants that developed allergic manifestations showed enough suggestion of latent allergy to warrant early adaptation of the formula. The most helpful sign was an erythematous linear fold in the postauricular region or beneath the lobe of the ear, more striking beneath the left than the right ear. In addition the usual premonitory expressions of allergy such as a hairless scaly scalp and desquamated dry skin were helpful. When these manifestations in the newborn were corroborated by an allergic history in either parent, the infant was considered a problem in latent allergy. Neuropathic infants were recognized by hypertonic manifestations during the first days of life. There was predominance of the flexor muscles with generalized and continued spasticity, restlessness, sleeplessness and irritability. Infants with latent developmental disorders were too varied to permit of any single procedure to be of value for early diagnosis.

*Series VII Individualized Formulas.* Fifty normal infants were maintained on individualized formulas for three months. The type of feeding selected was in accordance with the indications of the individual infant. Long lean infants were given 75 calories per pound of body weight per day and lateral infants were given 60 calories. The former were fed concentrated whole milk mixtures, three to one dilution with 10 per cent added carbohydrate and the latter diluted milk mixtures, one to one dilution with the same amount of added carbohydrate. Infants with latent allergy were given evaporated milk, one to two dilution with 10 per cent added carbohydrate, with a caloric intake depending upon their body build. Infants with hypertonia were maintained on acid milk, 1 tablespoonful to 2 ounces of water with 10 per cent added carbohydrate.

The formulas were started the second day of life in well newborns with a birth weight over 6 pounds. Although four of the group studied had difficult deliveries there were no post-natal manifestations. Orange juice and cod liver oil were introduced the third week. The orange juice was first given half strength and increased gradually so that 2 ounces were given by the end of the first month. The 10 D cod liver oil was offered 5 drops a day increasing it gradually until the infant received 1 teaspoonful a day. The formulas were made up for

gained more rapidly than those on the fresh milk mixtures. The gains in height were the same on all types of feeding during the first three months. The incidence of infection was about the same for each group of infants studied.

5 Standard routine formulas were effective in over 80 per cent of the infants studied. The

residual nonconformists represented infants with latent constitutional disorders—organic, allergic and neuropathic—with either lowered digestive capacities or diminished tolerance. The early recognition of these types displaced routine by individualized feeding. This group showed the highest percentage of successful infant feeding.

## COMPARATIVE RESULTS ON ROUTINE AND INDIVIDUAL FORMULAS

	Breast Milk	Whole Milk Formula	Diluted Milk Formula	Evaporated Milk Formula	Powdered Milk Formula	Acid Milk Formula	Individualized Formula
Age of Infants (Wks)	1-12	1-12	1-12	1-12	1-12	1-12	1-12
No Cases	55	54	59	58	60	56	50
Difficult Deliveries	5	7	3	6	5	7	4
Duration of Feeding (Days)	85	80	82	86	85	88	85
Supplements	OJ&CLO*	OJ&CLO	OJ&CLO	OJ&CLO	OJ&CLO	OJ&CLO	OJ&CLO
Av Vol/Feedings (Ozs)							
1 mo	(3.8)	4.0	4.2	4.2	4.1	3.8	4.4
2 mo	—	5.2	5.4	5.0	5.1	5.3	5.5
3 mo	—	6.0	6.5	6.1	5.9	6.2	6.5
Av Vol/Day Feedings (Ozs)							
1 mo	(22)	24	25	25	24	22	26
2 mo	—	26	27	25	26	26	27
3 mo	—	30	32	31	29	31	33
Av Intake Cal/Lb/Day	(56)	60	52	66	60	67	70
Av Gain Wt Ozs/Wk	6.9	6.0	5.9	7.1	6.4	7.1	7.3
Av Gain Ht (Mo)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Av No Stools/Day	2.5	3.3	2.5	2.6	2.4	2.7	2.6
% Digestive Disturbances	8	24	12	9	11	10	2
% Infections	7	9	5	8	10	6	8
% Successful Feeding	90	70	85	88	86	88	95

OJ = Orange juice  
CLO = Cod liver oil

## MILKS INDICATED FOR INFANTS

INFANT TYPES  
(392 Babies)

## Linear (20%)

Breast Milk  
Cow's Milk (3.1)  
Evaporated Milk (1.1)  
Powdered Milk (1.7)

## Medial (25%)

Breast Milk  
Cow's Milk (2.1)  
Evaporated Milk (1.1½)  
Powdered Milk (1.8)

## Lateral (55%)

Breast Milk  
Cow's Milk (1.1)  
Evaporated Milk (1.2)  
Powdered Milk (1.10)

INFANT DIATHESSES  
(45 Cases)

## Allergic (65%)

Breast Milk  
Goat's Milk  
Evaporated Milk  
Powdered Milk  
Vegetable Milk

## Neuropathic (30%)

Breast Milk  
Thick Feeding  
Evaporated Milk  
Acid Milk

## Developmental (5%)

Breast Milk  
Evaporated Milk  
Acid Milk

after the second month the percentage of disturbances was parallel to those in the other groups

A significant number of digestive upsets occurred in the group maintained on breast feeding. Excluding disturbances resulting from faulty technic in nursing, those that persisted were of the same order of magnitude as in the infants on artificial feeding. The time-honored procedure of analyzing breast milk chemically for the gross constituents is considered irrelevant. Even analysis of the minutiae is unnecessary because deficiency disease has a long latent period before inducing disturbances. The difficulty, we believe, is usually with the infant constitutionally and not with the milk chemically. But weaning was not deemed necessary until supplementary procedures failed to allay the disturbance.

The formulas prepared from processed milk were the best tolerated. Offhand, these would appear the most logical for routine use in infant feeding if nursing is impossible, but such an approach defeats the very purpose of infant nutrition. The type of feeding that meets with the digestive capacities of the infants is indicated rather than that which least utilizes digestive mechanisms. It is the newborn's task to adapt to "foreign" foods—a biologic and therefore a physical necessity. Ability to digest a food is gained by ingesting the food in gradually increasing amounts. The more work the digestive mechanism is made to perform, the greater the alimentary efficiency. The indications in normal infant feeding are fresh milk mixtures for the infants that can tolerate them and processed milk mixtures for those with diminished digestive capacities.

*III Comparative Nutritional Status* The adequacy of each type of feeding is best determined by the character and rate of growth of the infants of each group. But again growth evaluation is clinical rather than quantitative because we have no absolute standards of the composites of growth for each age level. Average weights and measurements of infants cannot be taken as guides for the developmental progress of an individual infant for the average infant is nonexistent. Developmental progress of an infant can best be evaluated in terms of himself as a standard and the increments of growth occurring at periodic intervals as the individual criteria of satisfactory achievement. These are based more upon clinical judgment than upon mere measurement. They include a variety of external manifestations of well-being such as type of facies, color of mucous membranes, condition of skin, quality of subcutaneous tissues, tissue turgor, muscle tone and skeletal characteristics. Even these properties of an infant are during the first

weeks of life, more an expression of his heredity and constitution than of the type of feeding instituted.

Each group of infants thrived on the various formulas as on the breast feeding. The greatest gain in weight was in those on individualized feeding and the least on the diluted milk formulas. The infants on breast feeding and on the processed milk formulas gained more rapidly than those on the fresh milk mixtures. The more concentrated the formulas the more rapid is the weekly gain in weight. In no groups did this necessarily represent mere accumulation of adipose tissue. Despite the high gains in weight there were no manifestations of overfeeding. In fact we have observed no absolute relation between the high gains in weight and quantities of formulas ingested. This applies to both the breast and artificially fed infants. Large lateral infants, for example, with birth weights of about 8 pounds made more satisfactory gains on 20 ounces of a formula per twenty-four hours than did the long lean infants with a birth weight of about 7 pounds on an intake of 25 ounces. But on all types of feedings the gain in height was practically the same at least for the first three months. In each group the incidence of infection was about the same, acquired in most infants from adult contacts.

#### CONCLUSIONS

1 Comparative studies of "standard" formulas were made on 337 infants during the first three months of life with fifty-five breast fed infants as controls. The formulas consisted of whole milk, half diluted milk, evaporated milk (1 1/2 powdered whole milk (1 tablespoonful to 2 ounces of water), powdered lactic acid milk (1 tablespoonful to 2 ounces of water), each reinforced with 10 per cent added carbohydrate. Each group maintained on a routine formula was compared with a group of fifty infants given individualized formulas.

2 The infants consumed more of the processed milk formulas than of the fresh milk formulas and the maximum was on individualized feedings throughout the period of study. The least number of digestive disturbances was observed on breast feeding and on individualized formulas.

3 The linear type infant required about 70 calories per pound of body weight and tolerated concentrated milk mixtures while the lateral type infant required about 55 calories per pound of body weight and tolerated diluted milk mixtures better.

4 Maximum gains in weight were observed in infants on individualized feeding and the minimum on diluted milk formulas. Infants on breast feedings and on processed milk feedings

gained more rapidly than those on the fresh milk mixtures. The gains in height were the same on all types of feeding during the first three months. The incidence of infection was about the same for each group of infants studied.

5 Standard routine formulas were effective in over 80 per cent of the infants studied. The

residual noneconformists represented infants with latent constitutional disorders—organic, allergic and neuropathic—with either lowered digestive capacities or diminished tolerance. The early recognition of these types displaced routine by individualized feeding. This group showed the highest percentage of successful infant feeding.

## COMPARATIVE RESULTS ON ROUTINE AND INDIVIDUAL FORMULAS

	Breast Milk	Whole Milk Formula	Diluted Milk Formula	Evaporated Milk Formula	Powdered Milk Formula	Acid Milk Formula	Individualized Formula
Age of Infants (Wks)	1-12	1-12	1-12	1-12	1-12	1-12	1-12
No Cases	55	54	59	58	60	56	50
Difficult Deliveries	5	7	3	6	5	7	4
Duration of Feeding (Days)	85	80	82	86	85	88	85
Supplements	OJ&CLO*	OJ&CLO	OJ&CLO	OJ&CLO	OJ&CLO	OJ&CLO	OJ&CLO
Av Vol/Feedings (Ozs)							
1 mo	(3 S)	4.0	4.2	4.2	4.1	3.8	4.4
2 mo	—	5.1	5.4	5.0	5.1	5.3	5.5
3 mo	—	6.0	6.5	6.1	5.9	6.2	6.5
Av Vol/Dav Feedings (Ozs)							
1 mo	(22)	24	25	25	24	22	26
2 mo	—	26	27	25	26	26	27
3 mo	—	30	32	31	29	31	33
Av Intake Clas/Lb/Dav	(56)	60	52	66	60	67	70
Av Gain Wt Ozs/Wk	6.9	6.0	5.9	7.1	6.4	7.1	7.3
Av Gain Ht (Mo)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Av No Stools/Day	2.5	3.3	2.5	2.6	2.4	2.7	2.6
% Digestive Disturbances	8	24	12	9	11	10	2
% Infections	7	9	5	8	10	6	8
% Successful Feeding	90	70	85	88	86	88	95

OJ = Orange juice  
CLO = Cod liver oil

## MILKS INDICATED FOR INFANTS

INFANT TYPES  
(392 Babies)

Linear (20%)	Medial (25%)	Lateral (55%)
Breast Milk Cow's Milk (3.1) Evaporated Milk (1.1) Powdered Milk (1.7)	Breast Milk Cow's Milk (2.1) Evaporated Milk (1.1½) Powdered Milk (1.8)	Breast Milk Cow's Milk (1.1) Evaporated Milk (1.2) Powdered Milk (1.10)

INFANT DIATHESSES  
(45 Cases)

Allergic (65%)	Neuropathic (30%)	Developmental (5%)
Breast Milk Goat's Milk Evaporated Milk Powdered Milk Vegetable Milk	Breast Milk Thick Feeding Evaporated Milk Acid Milk	Breast Milk Evaporated Milk Acid Milk

after the second month the percentage of disturbances was parallel to those in the other groups

A significant number of digestive upsets occurred in the group maintained on breast feeding. Excluding disturbances resulting from faulty technic in nursing, those that persisted were of the same order of magnitude as in the infants on artificial feeding. The time-honored procedure of analyzing breast milk chemically for the gross constituents is considered irrelevant. Even analysis of the minutiae is unnecessary because deficiency disease has a long latent period before inducing disturbances. The difficulty, we believe, is usually with the infant constitutionally and not with the milk chemically. But weaning was not deemed necessary until supplementary procedures failed to allay the disturbance.

The formulas prepared from processed milk were the best tolerated. Offhand, these would appear the most logical for routine use in infant feeding if nursing is impossible, but such an approach defeats the very purpose of infant nutrition. The type of feeding that meets with the digestive capacities of the infants is indicated rather than that which least utilizes digestive mechanisms. It is the newborn's task to adapt to "foreign" foods—a biologic and therefore a physical necessity. Ability to digest a food is gained by ingesting the food in gradually increasing amounts. The more work the digestive mechanism is made to perform, the greater the alimentary efficiency. The indications in normal infant feeding are fresh milk mixtures for the infants that can tolerate them and processed milk mixtures for those with diminished digestive capacities.

*III Comparative Nutritional Status* The adequacy of each type of feeding is best determined by the character and rate of growth of the infants of each group. But again growth evaluation is clinical rather than quantitative because we have no absolute standards of the composites of growth for each age level. Average weights and measurements of infants cannot be taken as guides for the developmental progress of an individual infant for the average infant is nonexistent. Developmental progress of an infant can best be evaluated in terms of himself as a standard and the increments of growth occurring at periodic intervals as the individual criteria of satisfactory achievement. These are based more upon clinical judgment than upon mere measurement. They include a variety of external manifestations of well-being such as type of facies, color of mucous membranes, condition of skin, quality of subcutaneous tissues, tissue turgor, muscle tone and skeletal characteristics. Even these properties of an infant are, during the first

weeks of life, more an expression of his heredity and constitution than of the type of feeding instituted.

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by the country merchant, the agent of a large corporation, the radio magazines, and newspapers, also social workers from larger towns. The agent makes regular trips from house to house, finding out what ails the people and recommending a cure.

Eight hundred and forty-three Vermonters died of typhoid each five years from 1857 to 1897. From 1897 to 1901 248 died. There were 125 deaths during the five years before 1921. Twenty-one died in the last five years.

From June to October we were busy caring for typhoid fever, cholera infantum and digestive troubles of older people. The early reduction of deaths from typhoid was partly due to the use of better air, more food and cool sponging. The real advance was made by protecting the well folks from the excretions of the sick and later, vaccination. The last death from typhoid in the town of Cabot was in 1905.

Diphtheria took 1,350 lives each five years from 1867 to 1897. Three hundred and sixty-five died during 1897 to 1901. There were 119 deaths from 1916 to 1921. The last five years the number was sixteen. We commenced the use of antitoxin in the early 1890's. Diphtheria was conquered, partly by the curative use of antitoxin, but mostly by isolation of the sick and the immunizing use of antitoxin and toxoid. The only diphtheritic deaths in Cabot have been from membranous croup. The last death was in 1912.

Scarlatina killed 587 each five years of the forty preceding 1897. From 1897 to 1901 the deaths were 89. The last five years they were 36. We have had three epidemics of the mild form in Cabot. Twice the severe form has started but was confined to a single family. There has been no death from this disease in Cabot for 40 years.

Forty years ago the sewage from the kitchen sink and the chambers was run into an open pool, just outside the kitchen window. There was an unscreened privy at the far end of the woodshed. The babies often took their unclean milk from an unclean nipple and through a long rubber tube, partly filled with curdled milk from a previous feeding. We did not know that flies carried the germs of disease, or that such germs thrived on the milk in that tube.

About 200 babies died each year of cholera infantum. Now the average number is 18. We soon had the people drain the pools, screen the privies and put a clean nipple directly on a clean bottle. During the war and soon after nearly all the homes were equipped with sanitary plumbing. Another disease was ended by protecting the well persons from the cause of that disease. The last death from cholera infantum in Cabot was in 1915.

So far as the saving of human life is concerned, the greatest advance has been made in

the care of tuberculosis of the lungs. This disease killed 732 Vermonters each of the years 1857 to 1897. The average for 1897 to 1901 was 455. In 1920 it was 254. During the last five years the deaths have been 157 per year. When in 1897 I first put a patient in an outdoor sleeping room, it was for the patient's good. I soon learned that the chief value of that plan was the protection of the rest of the family. Altitude, climate, diet, drugs and surgery have each had their turn before the spotlight. Each has helped some, but the greatest help has come from the isolation of the carrier.

There was a yearly average of 7,437 child-births in Vermont from 1896 to 1900. The number was about the same until 1925. From 1925 the births rapidly decreased. The last five years there were only 6,348 per year. There were 8,102 in 1908 and 5,985 in 1935.

There were 40 puerperal deaths per year from 1897 to 1901, then 48, 51, 45, 37, 41, 39 and 35. During the first twenty years nearly all these confinements were in the homes. The poorly prepared family physician attended. During the last twenty years they have been in the care of well-qualified physicians and many of them in good hospitals. The average annual deaths for each thousand births is an index of the service given our women. They were, for the eight five-year periods, 53, 64, 56, 49, 54, 56, and 56. During the last five years more than 10,000 babies have been born in hospitals. Our best record was in 1934 when the death rate per 1,000 was 34. Last year, 2,300 of the 6,000 births were in hospitals and the rate was 65 per thousand.

The annual deaths from toxemia for the same periods were 12, 14, 15, 17, 17, 16, 14, 10.

The deaths from puerperal septicemia, a communicable and preventable disease, were 13, 12, 20, 14, 7, 8, 13, 11.

Deaths from hemorrhage were 5, 2, 4, 6, 8, 5, 6 and 5.

Deaths from all other causes were 10, 20, 13, 8, 6, 11, 7, 8.

The reports show about 25 deaths from cesarian section. Many of the doctors did not know in 1896 that they could carry puerperal septicemia from one woman to another. Neither did the domestic nurse know that she could carry it. The prospective mothers did not know the need of surgical cleanliness. We did not know that diet and medical care could prevent most of the severe toxemias. We did not have the pituitary preparations, the powerful oxytocic active principles of ergot had not been discovered. We could not or at least did not, make use of blood transfusions. There were no cesarian sections. By special vote of the directors of Mary Fletcher Hospital a woman in labor was admitted Nov. 29, 1902. Dr. P. E. McSweeney, assisted by Drs. Wheeler, Tinkham

## VERMONT STATE MEDICAL SOCIETY

MEDICAL SERVICE IN VERMONT SOME CHANGES  
IN FORTY YEARS\*

BY L W PURBANK M D

I WISH to call your attention to some of the changes which have taken place in medical service in rural sections of Vermont during the past forty years. I refer especially to methods of dealing with those diseases which are communicable.

The centralization of medical practice has increased more in twenty-five years than in a full century before that time. Since 1896, sixteen years have been added to the average span of human life. That is a larger increase than has taken place in any other forty years since the beginning of recorded history. In the rural sections of Vermont, the chief gain along this line was due to the efforts of the family physician. He did most of the preventive work until about 1920. Since that time the work has been done more and more by social workers from the larger towns.

The town of Cabot, thirty-six square miles in area, has been for forty years the home of about eleven hundred persons, nearly all farmers. Cabot village, about 1150 feet above sea level, has a population of about 225.

In the northern corner of the town rises the Winooski River which flows to the southwest, down a narrow valley through Marshfield, a smaller town with a population of 900, and Plainfield. This valley is bounded on the northwest by the mountains of Woodbury and Calais, on the north by those of Walden and on the southeast by twelve miles of unbroken forest range, which includes the Gioton State Forest.

There are several summer roads over the western and northern passes at about 1800 to 2000 feet. There has been only one road over the eastern range, at more than 2,000 feet, and impassable for cars in winter.

In 1896 there were doctors in each of the towns surrounding Cabot. Now there are none, and the nearest resident physician is at Plainfield, twelve miles away.

My boyhood home was in Walden, half a mile over the northern pass in the Lamouille watershed. I was the second of six sons of a poor farmer, on a good farm. When we were young, we attended eight weeks of school in the fall and twelve in winter. At the age of thirteen or fourteen we went to work out on farms to help support the family. We worked for our board

and went to school during the twelve weeks in winter. I was given my time when seventeen years old. I then worked on a farm for my board and walked three miles to attend school about eighteen weeks in the fall and winter. The rest of the year I received wages. I taught school twelve weeks and worked on a farm two months from the age of nineteen until I was graduated from the medical college in this city (Burlington) in 1896.

I moved four miles down the valley to Cabot and have been an average country doctor for forty years. There were two other doctors in Cabot for a few years, then but one who remained in active practice until about ten years ago. Professionally, it is now a lonely life. It is not uncommon to go a month or two without seeing another doctor.

There were 638 doctors in Vermont forty years ago, one in nearly every village. Many of the country doctors were country boys who had paid or nearly paid their way through school and college. They commenced work when twenty-one to twenty-four years of age. If we take present conditions as a standard they had a poor technical preparation, but they did know their people. The number in the state remained about the same until 1915. At that time there were 627 but in 1935 the number had been reduced to 415.

Towns now having hospitals had 243 and those with no hospitals had 395. In 1920 the number in each class of towns was 266. In 1935 hospital towns had 249 and the others 165. Hospital towns gained 29,000 population in thirty years and now have 147,000, or 600 to each doctor. The other towns lost 13,000 and now have 213,000 or 1,300 for each doctor.

Our Council on Medical Education was formed in 1904. The object was to secure fewer but better physicians for the work. We decided to kill 100 of the 160 medical schools. We were so brutal in our attack on men like myself and the colleges from which we graduated that we did not gain much. In 1908 we were joined by the great and powerful Carnegie Foundation. Another survey was made. Recommendations were made for the elimination of 120 colleges. Only two were to be left in New England. The added time and cost of preparation secured the desired result. The present graduate cannot afford to go to a small town. The small town doctors have moved away, died or lost the confidence of the people. Their work is taken over

President's Address. Presented at the Annual Meeting of the Vermont State Medical Society at Burlington October 15 1936.  
†Burbank, L. W.—President Vermont State Medical Society, 1935-1936. For record and address of author see "This Week's Issue" page 1313.



third day I tell them to come for an examination in a month. They do not come. When I am engaged for a confinement case I make an examination. To prevent infection, the prospective mother boils, washes, dries in the sunshine, and irons sheets, pillow slips, towels, night clothes and a bundle of clean cloth. These are wrapped in clean paper and put in a bureau drawer. We try to have plenty of clean newspapers. I try to keep all these things free from dust or other things not clean.

The woman lies on her left side with knees drawn up during the last efforts. She is covered with a clean piece of cloth about one yard square. Over that is a clean sheet. I wear a glove and an apron or gown. The hair is clipped. It is never shaved. I make a vaginal examination as often as is necessary to keep informed as to the progress of labor. I never make a rectal examination. I would make them all rectal if I was where I thought there might be sources of infection. I try to have only one other person in the room. She is on the other side of the bed giving ether. If the perineum is torn to a slight or moderate degree I put sterile gauze in the vagina and place the stitches while the mother is on her side and still partly under the influence of ether. The ends are left long and held by snaps. While I am placing the stitches, my helper is at my left. With a hand wrapped in sterile gauze she supports the flesh above my work. Stitches are tied after the placenta is removed.

During any other operative work the patient is in the dorsal position. I try to make the caretaker know what I mean by keeping clean. If I do not dare trust her, a package of clean pads are placed where the mother can reach them. She changes her pads. I then go home feeling that if that woman has puerperal septicemia, it is because I carried it to her by means of my nose or throat.

There were 463 mothers and 860 confinements.

There were 871 babies, 843 of them were living and livable.

There were seven pairs of twins. Thirteen of these babies were living and livable.

One set of triplets was born at six months. They were born dead or died in a few hours.

There were 13 malformed babies. These were nearly all born dead or died in a few days or weeks. They were hydrocephalic or spina bifida. One had a perfect body and limbs but no head.

One had hydrocephalus and spina bifida. She is now living at three years of age.

Dr. Corson and I each had one case of ophthalmia neonatorum. Neither of us had any of the impetigo contagiosa group of diseases.

When necessary I have used high forceps, done internal versions and craniotomies. Twice I have done internal version after a hand has been born. One of the babies lived. On each occasion I had the assistance of two neighbors.

I have not told these personal experiences to show my crude ways, but for their bearing on the subjects of infection and immunity.

Dr. Corson of Plainfield has allowed me to use his records while studying immunity. He has been in Marshfield and Plainfield for about twenty years. He is clean in his obstetric work, and more modern than I in his methods. Dr. and Mrs. Corson have cared for about 225 births in their own homes. The doctor has cared for enough others in the patients' homes to make over 700. He has had only one mild case of puerperal infection. The only death in his series of home deliveries was one that was caused by hemorrhage. I went down to try and help him, but I could add nothing to his efforts.

We have probably had the usual number of abortions. Some are induced. During the early years drugs were used. Oil of tansy, oil of cedar, and so forth, also fluid extract of ergot, were among those employed. The drugs frequently produced convulsions but the patients did not die. Then came an era of mechanical starters used by doctors in other towns. We then had many infections, but no deaths. For many years the woman or a friend has produced the abortion. Sometimes I am called to complete the operation. My call is generally on account of hemorrhage. If the patient is a multipara I use my hand or a dull curette. I always use a tampon for a primipara, unless I fear infection. There has been no death from abortion in the town of Cabot for forty years.

#### SUMMARY

So far as clinical puerperal septicemia is concerned, the child-bearing woman of the upper Winooski Valley, has for forty years been immune to all the germs in, on, or about her own body, and to most of those in her own home.

The doctors, who have practiced in the small towns of Vermont, have been useful members of the communities where they have lived.

and Arnold performed a cesarian section. The second birth in the hospital was another cesarian in 1905. The first normal case was in 1907. Last year there were 760 births in the hospitals in or near Burlington. Nearly every large town now has a good hospital where an increasing amount of maternity work is done.

Eight hundred and seventy children have been born in Cabot since 1896. Thirty-two have been born in hospitals, mostly in nearby cities. About twenty-five have been cared for in the home of Dr. and Mrs. Corson of Plainfield. I have attended 600 in Cabot—enough in surrounding towns to make a total of 871.

Ten years ago I reported to this society the deaths of all women in my care, who died between the sixth month of pregnancy and two months after confinement. Today I report only those classed as puerperal deaths by state and national health departments.

The first fatal case was after I had been in practice seven years. The woman was 23 years old, had been in the care of a specialist during pregnancy. She lived six miles over the mountains. The husband called me by telephone and said that his wife was "bloated big" and had been "blind as a bat" for two hours, and that her doctor was too busy to come. I insisted on counsel. She was in convulsions when we arrived. I gave her ether. The dead child was delivered by forceps. The room was kept dark and quiet. Eliminative treatment was commenced. When I went up the next day she was having convulsions about once each hour. The specialist had been there. Large doses of morphine were being used. I did nothing. The specialist was there that day and the next. I was sent for on the fourth day because her doctor could not attend her. She died a few minutes after I arrived. I signed the death certificate.

The next fatal case was one of my patients, a Para-VI, aged 29 years. She had no care during pregnancy. She had borne five children in rapid succession. Her pregnancies had been increasingly toxic. I had told her during her last pregnancy that she would not be likely to live through another. I did not know of the sixth pregnancy. When I arrived she had a blurred vision, was very edematous and had an intense headache. The boiled urine looked like custard, the blood pressure was 220. When I said she had not been fair with me, she told me she knew that, but she did not want to live. She soon had a convulsion and did not again become conscious. The baby was unborn.

The other toxic death was that of a short, stout Para-IV, aged 27 years. She was tender in her right upper abdomen before and during her third pregnancy. She was nauseated, but

did not vomit much. The skin was slightly bronzed during the last month. Labor was normal and recovery good. Two years later her hepatic symptoms returned. She consulted a surgeon who advised an operation. She did not follow the advice. Four years after the birth of her last child, she again became pregnant. Her toxic condition was worse than the first time. She could not afford a nurse. I would not care for her unless she did have one. A friend offered to help if she would go to a hospital. She went to the hospital, had twins and died. I report this as one of my deaths because I think she would have died at home.

I attended ten other women who had severe toxemias. Seven of them had convulsions. During the last ten years only two have been severely toxic. One recovered at home. The other had no place to be sick at home. She went to the hospital and had an ordinary labor.

During the first thirty years I cared for fifteen women who had severe hemorrhages. They all lived. There were four placenta praevias, one of which was marginal. A few times I had another doctor to help, but such cases cannot wait for help. Two of the placenta praevias were delivered by internal version. In one case, one man and one woman helped. The mother and baby both lived. One woman helped in the other case. My helper was six months' pregnant. There was not a clean cloth in the house. She brought in, from the clothesline, some clothes which had been boiled, washed and hung out to dry. The patient was in a dirty bed, in a pool of blood, and had fainted. There was a boiler full of boiling soapsuds on the stove. No ether was used. The mother and baby did finely.

I never saw the time when I would volunteer to care for a placenta praevia without the aid of another doctor and nurse. I have recognized two placenta praevias since 1926. One went to a hospital two weeks before labor. She did not recover. The other had several hemorrhages at home, then had cesarian section in a hospital. She made a slow but good recovery. She had a live baby.

There were two cases of puerperal septicemia. Both were in clean homes. Both had plenty of clean clothes. Both had normal labors. The domestic nurses who cared for them were clean and intelligent. One case was normal until the tenth day. Then she had a long severe sickness and recovered at home. She did not have any evidence of pus. The other case had a normal pulse and temperature when I saw her the third day, but was very tender over the left fallopian tube. She had a discharge of much pus the fifth day. She went to a hospital and recovered.

I generally see my patients the second or

# Case Records

ANTE MORTEM AND POST MORTEM

AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

AT THE

MASSACHUSETTS GENERAL HOSPITAL

*Founded by* RICHARD C CABOT, M D

TRACY B MALLORY, M D, *Editor*

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VOLUME 22

1936



INDEX  
CABOT CASE RECORDS  
VOLUME 22  
1936

The date of publication of any case may be determined from the case number. The first two figures of each case number indicate the volume number, 22. The third and fourth figures give the number of the week, dating from January 1. The last figure gives the case number for the week. For example Case 22362 is the second case for the 36th week of Volume 22.

- Abscess, psoas 22112
  - of lung multiple 22192 22531
- Adenoacanthoma of sigmoid 22332
- Adenoma of bronchus 22231 22232
  - of pituitary, 22012
- Adrenal, tuberculosis of 22241
  - miliary 22331
- Anemia see Blood
- Aneurysm dissecting of aorta 22151
  - of common iliac artery partial 22151
  - of renal artery partial 22151
- Aortitis subacute 22141 22142
  - syphilitic, 22152
- Appendix, carcinoid of 22511
- Bile duct carcinoma of, 22492
  - papilloma of at papilla of Vater 22161
- Bladder carcinoma of epidermoid 22062 22192
  - tuberculosis of, miliary 22112
- Blood diseases of
  - Anemia myelophthisic 22482
  - Leukemia, aleukemic myeloid 22282
  - Myeloma multiple 22122
    - plasma cell type atypical 22502
  - Myelopoiesis extramedullary 22502
  - Polycythemia vera, 22022
- Bone, sarcoma of, osteogenic 22242
- Brain infarct of 22212
- Bronchiectasis 22011 22042 22381
- Bronchus adenoma of 22231 22232
  - carcinoma of, with metastases to liver 22111
- Carcinoid of appendix 22511
- Carcinoma of bile ducts 22492
  - of bronchus 22111
  - of colon multiple 22321
  - of gall bladder 22081
  - of jejunum 22262
  - of liver 22051
  - of lung 22162 22191
  - of pancreas 22252 22281 22291 22371 22442 22482
  - of prostate, 22421 22461
  - of rectum 22171
  - of stomach 22362
    - with perforation 22132
- adeno- of cecum 22222 22272
  - of colon 22432
  - of pancreas with generalized metastases 22481
  - of thyroid 22302
- epidermoid of bladder 22062 22192
  - of esophagus 22462
  - of lung 22361 22372
- renal cell of kidney 22091 22221
  - recurrent 22091 22221
- Cirrhosis see Liver
- Colitis see Intestine
- Cyst dermoid of ovary with some teratomatous elements 22522
  - follicular of ovary with rupture 22512
- Diverticulitis of sigmoid 22422
- Diverticulum Meckels 22101
- Embolism paradoxical subclavian brachial iliac and
  - cerebral artery 22212
  - pulmonary 22171 22211 22212
- Emphysema pulmonary 22011 22022
- Empyema, tuberculous 22532
- Endarteritis pulmonary 22471
- Endocarditis see Heart
- Endometrioma of sigmoid with sarcomatous degeneration 22412
- Esophagus carcinoma of epidermoid 22462
  - varix of, with rupture and hemorrhage 22451
- Femur, osteogenic sarcoma of 22242
- Fibroma neuro- of mediastinum 22351
- Fibrosis pulmonary 22011 22071 22102 22381
- Gall bladder carcinoma of 22081
- Goiter mediastinal 22352
- Gumma in region of clavicle 22322
- Heart
  - Anomaly of congenital interauricular septal defect 22212
  - Cor pulmonale 22022 22042 22471
  - Coronary disease of, sclerosis 22021
    - thrombosis 22131 22152
    - with occlusion, 22072 22152
  - Endocarditis bacterial acute 22292
    - subacute 22401
    - nonspecific aortic 22141, 22142
    - rheumatic chronic
      - aortic with insufficiency 22072
      - with stenosis 22301
      - without stenosis 22472
    - mitral with stenosis 22031 22041 22042 22072 22301 22472
    - tricuspid, with stenosis 22042, 22472
  - tuberculous 22201
- Infarct of 22072
- Myocarditis rheumatic 22041
  - tuberculous 22201
- Pericarditis acute fibrinopurulent 22152
  - tuberculous 22112 22201 22331
- Sarcoma of ? fibro- 22491
- Stenosis aortic calcareous 22301
- Thrombosis aortic with occlusion 22402
- Hernia diaphragmatic 22431
- Hypernephroma of kidney 22091
- Ileitis see Intestine
- Infarct of brain 22212
  - of lung multiple 22211
  - of myocardium 22072
- Intestine adenoacanthoma of 22331
  - carcinoma of 22171 22262 22321
  - adeno- 22222 22272 22432
  - colitis acute 22251
    - ulcerative chronic 22321 22391
  - diverticulitis acute 22422
  - diverticulum Meckels 22101
  - endometrioma of with sarcomatous degeneration 22412
  - ileitis of regional 22092
    - ulcerative 22391
  - intussusception of 22412 22452
  - lipoma of submucous 22452
  - perforation of traumatic ? 22392
  - polyp of 22082
  - sarcoma of adeno- 22412
  - ulcer of 22172 22182
    - gastrojejunal 22281



INDEX  
CABOT CASE RECORDS  
VOLUME 22  
1936

The date of publication of any case may be determined from the case number. The first two figures of each case number indicate the volume number, 22. The third and fourth figures give the number of the week dating from January 1. The last figure gives the case number for the week. For example Case 22362 is the second case for the 36th week of Volume 22.

- Abscess, psoas 22112
  - on lung multiple 22192 22531
- Adenocanthoma of sigmoid 22332
- Adenoma of bronchus 22231 22232
  - of pituitary 22012
- Adrenal tuberculosis of 22241
  - miliary 22331
- Anemia, see Blood
- Aneurysm dissecting of aorta 22151
  - of common iliac artery partial 22151
  - of renal artery partial 22151
- Aortitis subacute 22141 22142
  - sypilitic, 22152
- Appendix carcinoid of 22511
- Bile duct carcinoma of 22492
  - papilloma of, at papilla of Vater 22161
- Bladder carcinoma of epidermoid 22062 22192
  - tuberculosis of miliary 22112
- Blood diseases of
  - Anemia, myelophthisic 22482
  - Leukemia, aleukemic myeloid 22282
  - Myeloma, multiple 22122
    - plasma cell type atypical 22502
  - Myelopoiesis extramedullary 22502
  - Polycythemia vera 22022
- Bone sarcoma of osteogenic 22242
- Brain infarct of 22122
- Bronchiectasis 22011, 22042, 22381
- Bronchus adenoma of 22231, 22232
  - carcinoma of with metastases to liver 22111
- Carcinoid of appendix 22511
- Carcinoma of bile ducts 22492
  - of bronchus 22111
  - of colon multiple 22321
  - of gall bladder 22081
  - of jejunum 22262
  - of liver 22051
  - of lung 22162 22191
  - of pancreas 22252, 22281 22291 22371 22442 22482
  - of prostate 22421 22461
  - of rectum 22171
  - of stomach 22362
    - with perforation 22132
- adeno- of cecum 22222 22272
  - of colon 22432
  - of pancreas with generalized metastases 22481
  - of thyroid 22302
- epidermoid of bladder 22062 22192
  - of esophagus 22462
  - of lung 22361 22372
- renal cell of kidney 22091 22221
  - recurrent 22091 22221
- Cirrhosis see Liver
- Colitis see Intestine
- Cyst dermoid of ovary with some teratomatous elements 22522
  - follicular of ovary with rupture 22512
- Diverticulitis of sigmoid 22422
- Diverticulum Meckels 22101
- Embolism paradoxical subclavian brachial iliac and cerebral artery 22212
  - pulmonary 22171 22211 22212
- Emphysema pulmonary 22011 22022
- Empyema tuberculous 22532
- Endarteritis pulmonary 22471
- Endocarditis, see Heart
- Endometrioma of sigmoid with sarcomatous degeneration 22412
- Esophagus carcinoma of epidermoid 22462
  - varix of with rupture and hemorrhage 22451
- Femur osteogenic sarcoma of 22242
- Fibroma, neuro- of mediastinum 22351
- Fibrosis pulmonary 22011, 22071 22102 22381
- Gall bladder carcinoma of, 22081
- Golter mediastinal 22352
- Gumma in region of clavicle, 22322
- Heart
  - Anomaly of congenital interauricular septal defect 22212
  - Cor pulmonale 22022, 22042 22471
  - Coronary disease of sclerosis 22021
    - thrombosis 22131 22152
    - with occlusion 22072 22152
  - Endocarditis bacterial acute 22292
    - subacute 22401
  - nonspecific aortic 22141 22142
    - rheumatic, chronic
    - aortic with insufficiency 22072
      - with stenosis 22301
      - without stenosis 22472
    - mitral with stenosis 22031 22041 22042 22072 22301 22472
    - tricuspid with stenosis 22042 22472
  - tuberculous 22201
- Infarct of 22072
- Myocarditis rheumatic 22041
  - tuberculous 22201
- Pericarditis acute fibrinopurulent 22152
  - tuberculous 22112 22201 22331
- Sarcoma of ? fibro- 22491
- Stenosis aortic, calcareous 22301
- Thrombosis aortic with occlusion 22402
- Hernia diaphragmatic 22431
- Hypernephroma of kidney 22091
- Ileitis see Intestine
- Infarct of brain 22212
  - of lung multiple 22211
  - of myocardium 22072
- Intestine adenocanthoma of 22332
  - carcinoma of 22171 22262 22321
  - adeno- 22222 22272 22432
  - colitis acute 22251
    - ulcerative chronic 22321 22391
  - diverticulitis acute 22422
  - diverticulum Meckels 22101
  - endometrioma of with sarcomatous degeneration 22412
  - ileitis of regional 22092
    - ulcerative 22391
  - intussusception of 22412 22452
  - lipoma of submucous 22452
  - perforation of traumatic ? 22392
  - polyp of 22082
  - sarcoma of adeno- 22412
  - ulcer of 22172 22182
    - gastrojejunal 22281





Hampton Aubrey O, 22011 22022, 22071, 22072 22091 22092, 22101, 22121 22182 22191, 22201, 22211 22212 22232 22251 22291, 22311, 22331 22342 22362 22411, 22451 22461 22481, 22482 22521	Palmer, Robert S 22152, 22461 Rackemann, Francis M 22011, 22022 Richardson Wyman, 22122, 22202, 22271 22282 22421, 22442, 22451 Rogers Horatio, 22081 22512 Root Howard F, 22261 Sanderson Robert, 22491 Schatzki Richard, 22132 22422 22431 22452 Short Charles L, 22031 Simmons Channing C, 22242 Smith George G 22192 Smith William D, 22121 22202 22292 Smithwick Reginald H 22082 22092 Sowles Horace K 22311 22362 22371 22492 Sprague Howard B 22021 22131, 22141 22212 22231, 22461 22471 Starb Robert, 22021 Stewart John D 22252 22351 22382 22462 Sweet Richard H 22321, 22372 22382 22501 22532 Talbot John H 22072 22191 22481 Taylor Grantley W 22322 22452 Thompson William P 22472 Tolman Myer M, 22052 Townsend James H, 22232 22282 22291 Urmv Thomas V 22391 Van Gorder, George W 22201 Viets Henry R 22231 Vincent Beth 22101, 22202 22272 Wallace Richard H 22182 Weiss Soma 22151 22181 Welch Claude E., 22392 White Paul D, 22021, 22131 22171 22211 Young Edward L Jr 22411 22432
Hayden E Parker 22251, 22412 22422 Hertz Saul, 22311, 22312 Higgins, Harold L., 22312 22342 Holmes George W, 22041, 22061 22081, 22111 22141 22151, 22152 22192 22202, 22231 22282 22351 22352, 22382, 22391, 22441 22471 22491 22492 22501, 22531, 22532 Hunter, Francis T 22231, 22271 Jones Chester M 22101, 22111 22121 22161 22202 22261, 22291, 22391, 22451, 22481 22521 Jones Daniel F 22171 22251 Keefer Chester S, 22072 King Donald S 22011, 22061 22071 22171 22211 22232 22241 22292, 22351 22372 22381 22441 Kranes Alfred, 22122, 22261 22352 22502 Kubik, Charles S, 22012 Leland, George A., 22291 22371 Lerman, Jacob, 22312 Linton Robert R. 22311 22312 22422 22511 Lord Frederick T 22071, 22142 22162 22231 22381 22441, 22531 Vallory Kenneth 22161 McKittrick Leland S., 22181 22321 22391 22402 22412 Means J H. 22431, 22531 Miller, Richard H 22092 22371 22431 Mintz E Ross 22062 Oliver E Lawrence 22121 O'Neil, Richard 22221	

- Kidney, carcinoma of, renal cell, recurrent and metastatic, 22091, 22221  
hypernephroma of, 22091  
tuberculosis of, miliary, 22112, 22331  
(See also Nephritis)
- Leukemia, see Blood
- Lipoma, submucous, of intestine 22452
- Liver, carcinoma of, hepatoma, 22051  
cirrhosis of, toxic, 22031, 22202, 22261, 22521  
type undetermined, 22451
- Lung, abscess of, 22192, 22531  
bronchiectasis of, 22011, 22042, 22381  
carcinoma of, 22162, 22191  
epidermoid, 22361 22372  
embolism of, 22171, 22211 22212  
emphysema of, 22011, 22022  
fibrosis of, 22011, 22071, 22102 22381  
infarct of, 22211  
sarcoma of fibro-, 22441  
streptothricosis of 22231  
suppuration of, 22071  
thrombosis of, 22102, 22381, 22471  
tuberculosis of, 22061  
miliary 22112, 22241, 22331  
(See also Pneumonia)
- Lymphoblastoma, sarcomatous type of axillary mesenteric and retroperitoneal lymph glands 22052
- Mediastinum, fibroma of, neuro-, 22351  
goiter of, 22352  
sarcoma of, fibro-, 22382
- Meningitis, tuberculous, 22112, 22201
- Myeloma, multiple, 22122  
plasma cell type, atypical, 22502
- Myocardium, tuberculosis of, 22201
- Nephritis, glomerulo-, chronic 22032, 22072 22341  
vascular, 22172
- Osteitis fibrosa of skull, 22072
- Ovary, cyst of, dermoid, with teratomatous elements, 22522  
follicular, with rupture 22512
- Pancreas, carcinoma of 22252, 22281, 22291, 22371, 22442 22482  
adeno-, 22481
- Pancreatitis acute, 22411
- Papilloma of papilla of Vater 22161
- Parathyroid, hyperplasia of, secondary, 22072 22482
- Pemphigus 22052
- Periarteritis nodosa 22121, 22271
- Pericarditis see Heart
- Pericardium, tuberculosis of 22112 22201, 22331
- Peritonitis acute, 22392
- Phlebitis pyle-, 22501  
thrombo-mesenteric and hemorrhoidal veins 22501
- Pituitary adenoma of 22012
- Pneumonia broncho- 22292 22531  
streptococcus 22342  
lobar with multiple abscesses 22192  
tuberculous, acute 22061
- Polycythemia vera 22022
- Polyp, adenomatous of sigmoid 22082
- Pott's disease, 22112
- Prostate, carcinoma of 22421 22461
- Rectum, carcinoma of 22171
- Ribs, tuberculosis of 22201
- Sarcoma adeno-, of sigmoid, 22412  
fibro-, of heart 22491  
of lung, 22441  
of mediastinum 22382  
osteogenic, of femur and tibia 22242
- Spine, tuberculosis of, 22112 22201  
with psoas abscess 22112
- Spleen, tuberculosis of miliary 22112 22331
- Stomach, carcinoma of, 22362  
with perforation 22132
- ulcer of, 22192, 22281  
with hemorrhage 22461
- Streptothricosis, pulmonary, 22231
- Syphilis, of aorta, 22152  
(See also Gumma)
- Thromboangiitis obliterans 22181
- Thrombosis aortic 22402  
coronary, see Heart  
pulmonary 22102, 22381 22471  
(See also Phlebitis, thrombo-)
- Thyroid, carcinoma of, 22302  
hyperplasia of 22312  
mediastinal goiter 22352
- Thyroiditis, chronic Hashimoto's struma, 22311
- Tibia osteogenic sarcoma of 22242
- Tuberculosis of adrenal, 22241  
of lung, 22061  
of meninges, 22201  
of myocardium, 22201  
of ribs, 22201  
of spine, 22112, 22201  
miliary of adrenal, 22331  
of bladder 22112  
of kidney 22112, 22331  
of lung, 22112 22241, 22331  
of meninges 22112  
of pericardium 22112, 22201 22331  
of spleen, 22112 22331  
(See also Empyema)
- Ulcer duodenal, 22172 22182  
gastric, 22192, 22281  
with hemorrhage 22461  
gastrojejunal, 22281
- Vaiv esophageal, with rupture and hemorrhage 22451
- Vein see Phlebitis

# SPEAKERS IN DISCUSSIONS OR AUTHORS OTHER THAN DR TRACY B MALLORY

- Adams F Dennette 22301 22341, 22361
- Adams, Ralph, 22522
- Albright Fuller, 22072
- Allen Arthur W, 22111 22132 22281 22451 22481
- Aub Joseph C, 22091
- Baird, Perry C, 22052
- Baker Myles P, 22102 22482
- Barr Joseph S, 22242
- Bartlett Marshall K 22262 22302
- Bauer Walter 22091 22142
- Benedict Edward B, 22111, 22501
- Blake Gerald, 22131 22191, 22241 22282 22331 22371
- Bland Edward F., 22042, 22141
- Bock Arlie V, 22191 22201
- Bralley Allen G, 22172
- Breed William B, 22041, 22141, 22172, 22192 22201 22401, 22491
- Cabot Richard C 22211
- Cass John W, 22051, 22112
- Castleman Benjamin 22292 22301 22401 22402 22481 22482
- Cave Edwin F 22201
- Chapman Earle M 22032 22061
- Churchill Edward D 22162 22232 22322 22402
- Colby Fletcher H. 22221
- Cole Edwin M 22012
- Cope Oliver, 22222, 22411
- Daland Ernest M 22392
- Dearing W Palmer 22221
- Dienes Louis, 22231
- Dwight, Richard 22522
- Eustis, Richard S 22342
- Faxon Henry H 22181 22332
- Garrev, Walter E 22452
- Glendy Robert E 22331

CASE RECORDS  
of the  
MASSACHUSETTS GENERAL  
HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., Editor

CASE 22531

PRESENTATION OF CASE

A 26 year old male nurse was admitted complaining of cough.

Three days before entry the patient took a long automobile trip in an open car and that evening developed a nonproductive cough. There was no chest pain or chills. On the following day, however, he developed soreness along the costal margin on both sides, more on the right. Later this extended up into the right axilla and was described by the patient as a "catch in the side" while coughing. He felt chilly but there was no rigor. On the day before admission he remained in bed and the cough was at this time accompanied by a small amount of blood-tinged sputum. The discomfort became localized in the right posterior axilla and was aggravated by coughing. He felt chilly and his temperature was  $101\frac{1}{2}^{\circ}$ . On the day of entry his temperature rose to  $103^{\circ}$ , malaise became marked, and he had severe headache and anorexia. On the way to the hospital he became nauseated and vomited about a pint of greenish fluid.

Physical examination showed a well-developed, thin young man with flushed face lying flat in bed complaining of nausea and headache. The skin was warm and moist. The conjunctivae were moderately injected. The mucous membranes were dry. There was slight lessened motility of the right side of the chest and the right diaphragm appeared to be immobile. Resonance was diminished at the right base posteriorly and in the axilla. Breath sounds were likewise diminished, the respiratory phase being harsh in character. A few fine rales were audible in this region on deep inspiration. Spoken voice was not altered and tactile fremitus was normal. The remainder of the examination was negative.

The temperature was  $102^{\circ}$ , the pulse 126. The respirations were 32.

Examination of the urine was negative. The blood showed a red cell count of 5,200,000 with a hemoglobin of 80 per cent. The white cell count was 12,500, no differential count was re-

corded. Several specimens of sputum contained blood and examination showed that the pneumococci present were not Type 1, 2 or 3. Sputum cultures showed alpha hemolytic streptococcus and *Staphylococcus aureus*. Repeated blood cultures were negative. A Hinton test was negative. The blood chlorides were 94 cubic centimeters.

A portable x-ray film of the chest showed dense homogeneous dullness involving the region of the left upper lobe. The remainder of the lung fields appeared clear.

The patient's temperature remained between  $102^{\circ}$  and  $104^{\circ}$  and the pulse was consistently elevated between 90 and 110. On the second hospital day dullness with increased tactile fremitus was elicited in the right upper chest anteriorly and in the axilla. There were exaggerated voice sounds and bronchial breathing in this region. The patient remained fairly comfortable although the physical signs remained unchanged. From the second to the sixth hospital day his white blood cell count remained in the vicinity of 5,000 and 2 days later coarse rales became audible over the right upper and midchest. At this time the white cell count was 15,000. His temperature became irregular and varied between  $100^{\circ}$  and  $104^{\circ}$ . There was slight cyanosis and rales became audible throughout the entire right chest, although no dullness or bronchial breathing was noted. The white cell count continued to rise and at the end of 2 weeks was 31,000 with 99 per cent polymorphonuclears. Rales at that time were audible on both sides, more prominently on the right and an x-ray of the chest showed considerable clearing of the consolidation in the right upper lobe. There were, however, fleck-like areas of consolidation throughout the entire right lung field and to a lesser degree in the left lung field. The patient's respirations became labored and cyanosis appeared. He was placed in an oxygen tent with slight relief, but his condition became progressively worse. On the sixteenth hospital day the white cell count was 44,000 with 94 per cent polymorphonuclears. Physical examination showed cyanosis and distressed breathing. Loud coarse rales were audible throughout both sides of the chest. Irregular areas of dullness and bronchial breathing were elicited bilaterally. There were no areas of suppressed respiratory sounds, and tactile fremitus was normal throughout. The blood pressure was 140/80. He became rapidly worse and died on the seventeenth hospital day.

NOTES ON THE HISTORY

DR. FREDERICK T. LORD: The temperature (looking at chart) is elevated but intermittent, not remittent and tending downward. The pulse tends upward. It was pretty high all



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## NOTES ON THE HISTORY

Dr. FREDERICK T. LORD. The temperature (looking at chart) is elevated but intermittent, not remittent and tending downward. The pulse tends upward. It was pretty high all

through the illness. The respirations finally rose to sixty.

### X-RAY INTERPRETATION

DR GEORGE W HOLMES. In the portable film we have the characteristic picture of consolidation involving the region of the right upper lobe. That is quite typical and definite consolidation. Then 8 days later, the process has involved the entire right lung and I suspect the middle portion of the left, and this is characterized by a diffuse mottling. I am not certain about the cavity. In the record a cavity is mentioned and I think possibly that there is one present. This looks like the spread of a tuberculous pneumonia, a rapid spread of the disease after pneumonia.

DR LORD. I do appreciate your suggestion.

DR HOLMES. That might be misleading however.

### NOTES ON THE HISTORY CONTINUED

DR LORD. The symptoms of onset are atypical for lobar pneumonia which ordinarily begins abruptly with cough, pain, bloody sputum, chill and rapid elevation of temperature, all within a few hours, and in this case they are nonexplosive. There are early, severe, constitutional symptoms here, but variation in this respect in individual cases of the same type of infection are common and thus no help is to be derived from this aspect.

The pulmonary process was at first lobar or massive. Resolution took place rapidly in this region, followed by the appearance of scattered, small, soft, mottled areas of increased density.

There was at first a moderate leukocytosis, then a low white count and later a marked increase in the white cells in the blood.

We would like to know more about the sputum: was it rusty or tenacious? With respect to the bacteriology, Types I, II and III pneumococci can be excluded, but a higher type might have been present. It is desirable to know about tubercle bacilli in the sputum.

DR J H MEANS. There were no tubercle bacilli present, Dr Lord.

DR LORD. Though alpha hemolytic streptococci were found in the sputum, they are common in the respiratory tract, nonpathogenic and without special significance. *Staphylococcus aureus* is also a common finding in the sputum and I am not disposed to regard it as of special importance.

The x-ray findings are unusual, starting with a massive process, largely disappearing within 8 days with the appearance of a patchy, diffuse involvement.

Now to proceed to what it might be. Is it infarction or infection? The upper lobe is an

unusual site of infarction and, with an area of infarction of this size, we may expect frankly bloody sputum and more pleural pain. We may, I think, exclude infarction and then have left an infective process of some kind. Absence of preceding manifestations elsewhere puts it in the group of a primary pulmonary infection.

### DIFFERENTIAL DIAGNOSIS

With respect to the cause, the different types of pneumonic infection do not present distinctive clinical pictures, and the attempt should be made to classify them etiologically and that I suspect, is what I am supposed to attempt to do here.

In the absence of evidence regarding the etiologic agent, the best I can do is to enumerate the possible causes. Infection with a higher type of pneumococcus cannot be excluded. As already intimated, the alpha hemolytic streptococcus and the *Staphylococcus aureus* are of doubtful significance.

Regarding tuberculosis, the leukocytosis and the rapid resolution of the lobar involvement are against it. Initial massive tuberculous areas resolve, leaving scars and calcification, but only after the lapse of months. We may, I think, exclude tuberculosis. It might be plague pneumonia, but the duration is too long, the spleen should have been enlarged and, after all, we do not have plague here.

In addition, we have to consider two types of respiratory infection due to virus.

Is it influenza pneumonia? We must have interepidemic and interpandemic influenza to keep the virus alive. The leukocytosis is against uncomplicated influenza pneumonia and there was no preceding upper respiratory tract infection which occurs in 77 per cent of the cases. Experimental immunologic tests with the virus in animals would be necessary to prove it. I do not think influenza pneumonia can be excluded.

The second possibility is psittacosis and the inclusion with the x-ray films yesterday, when I saw them, of a paper with a notation regarding this disease leads me to discuss this possibility more at length. In psittacosis there is only a moderate or no leukocytosis, and the marked leukocytosis here is against uncomplicated psittacosis. There has been only limited opportunity for thorough study of pneumonic infections with this virus, but from such reports as are available the lung involvement is usually massive as in the upper lobe process here, and if spread takes place, it occurs with the development of fairly large focal processes unlike the numerous small scattered areas in this case. Patchy consolidation, however, was observed in the proved case reported by Sprunt and Berry. It would be desirable to know of exposure to

birds and especially parakeets, or to other cases of the disease. To establish this as the cause it would be desirable to investigate the blood or the sputum by passing the latter through a Berkefeld filter, the inoculation of mice intraperitoneally and the finding of psittacosis bodies in smears from the peritoneal exudate and establish the presence of an immunity against a known strain of the virus in the recovered mice. It is of some interest in this connection that investigations during the life of the patient are more likely to be successful than on the cadaver.

Finally, it seems to me that the only justifiable conclusion, with the evidence at hand is that he had an atypical pneumonia of unknown origin and that it may fall into one of the groups I have discussed.

DR TRACY B. MALLORY: Dr. Means, you might explain how the question of psittacosis came up in this case.

DR MEANS: I saw this patient only once. It was the day before he died. Dr. Jones was away and I was asked to take the visit. The patient was in an oxygen tent, was moribund, had deep cyanosis, and presented the picture of a very septic type of diffuse bronchopneumonia. We looked at the x-rays and thought it amazing that he should first have a picture which seemed to be lobar pneumonia, anatomically clearing up to be followed by one of bronchopneumonia of which he died. We did not have sufficient imagination to think of psittacosis at that time nor at the autopsy nor did the pathologist suggest it. The matter of psittacosis arose some time later when another nurse, a man of about the same age who was a friend of this one and who had been with this one, came in with a disease which bore some points of resemblance to this case and some points of difference. This second man, who is now well, presented the picture of slowly evolving pneumonia which involved the right lower lobe incompletely and was characterized by leukopenia from the beginning with very little intoxication, slight splenomegaly, and a course that clinically resembled mild typhoid rather than pneumonia. He went through a febrile period of about 10 days and defervesced by lysis uneventfully. He never had a frank lobar consolidation but had a lot of rales at the right base which finally disappeared. When this latter individual was at the height of his fever we got worried and wondered if both these patients had some strange disease which in the first one ran a fatal course. We did not know what it was. We talked with Dr. Dienes and I think he was the first man to suggest that both cases might be psittacosis. It turned out that neither man had been near a parrot since August when they both had been to a zoo and had walked by parrots but had not

fondled them. That was all we could do in the parrot line. Dr. Mallory went over the sections on the first case carefully at that time to see whether anatomically they bore any resemblance to the type of lesion described in psittacosis. We found that they did not. We do not know therefore whether the first man had psittacosis or not. We were inclined to believe that he did not and I am sure now that the second did not.

Dr. Loid asked a question about the sputum in this case. I saw the sputum and it was not in the least like that of lobar pneumonia, not rusty or tenacious, it was watery, full of pledgets of pus and a few blood streaks. I saw a great deal of influenza during the War and it did not resemble either of these cases, but they may be influenza nonetheless presenting a different picture because the secondary infection was different from what we were dealing with in 1918 and 1919. Dr. Russell made ward rounds with us and saw the second man. He was interested and thought that the leukopenia suggested a virus disease, very likely influenza and suggested that we get some serum from all the cases of this type and also some convalescent serum from this man and send them to the International Health Division for Dr. Frances to determine any anti-influenza activity which might be present. That is being done.

DR WILMAN RICHARDSON: I might add that aside from these two men there was one other nurse in the same hospital who took care of one of them and he was very sick for three or four days but recovered uneventfully. He had no great increase in white count and a few signs at the left base with rales. Then there were two more men among the same group of male nurses who ran a fever for 4 or 5 days and recovered without complication.

#### CLINICAL DIAGNOSES

- Septic bronchopneumonia
- Influenzal bronchopneumonia
- Pulmonary tuberculosis

#### DR. FREDERICK T. LORD'S DIAGNOSIS

Atypical pneumonia of unknown etiology

#### ANATOMIC DIAGNOSES

- Bronchopneumonia with abscess formation, staphylococcus
- Meckel's diverticulum
- Acute cystitis, slight
- Operation wound, appendectomy

#### PATHOLOGIC DISCUSSION

DR. MALLORY: Of course three cases of pneu-

monia do not necessarily constitute an epidemic but when they occur in close proximity, physically and temporally, one immediately becomes suspicious of the possibility, and the number of causes of epidemic pneumonia are relatively few. It was for that reason that both psittacosis and influenza were very seriously considered in this case. I am not sure that the autopsy findings give us any answer. We found at the time of postmortem examination that this right lung which had been originally involved had practically cleared up, whereas the left lung at the time of autopsy showed much more extensive involvement through the lung. This consisted of multiple abscesses and direct smears from these abscesses showed innumerable cocci with the characteristic arrangement of staphylococci. On culture it turned out to be a *Staphylococcus albus*.

The other findings at autopsy were a septic spleen which contained rather a larger number of mononuclear phagocytes than usual and a tremendous degree of hyperplasia of the bone marrow, so that at first glance one would actually think of leukemia. There are even a few very small foci of myelopoiesis in the liver. There was no true leukemic infiltration, however, and no myelopoiesis was found in the spleen. I believe the depth of the infection is an adequate explanation of the bone marrow findings.

I think we have to assume in this case an unknown primary contagious infection followed by a secondary pneumonia. We have no evidence as to what the etiology of the primary infection may have been. In the second case we did inoculate mice in order to rule out psittacosis. At what stage this staphylococcus came into the picture, I do not believe we can be sure. We can be confident it was not the primary infection. It may have been the secondary or may even have been the tertiary infection. During life he had three blood cultures of which two were negative and one showed a *Staphylococcus aureus* in one of two flasks but since the second flask inoculated at the same time was negative, that was interpreted as a contamination and therefore was not included in the record. It may have been significant.

DR LORD: I would like to ask Dr Holmes if he would agree about my interpretation of the spread of this being against tuberculosis?

DR HOLMES: Yes, but I think you can interpret that another way. If a patient had quiescent tuberculosis at the apex and an acute lobar pneumonia, as the pneumonia resolved there might be a breakdown and spread of the tuberculosis, so that I think it would be perfectly possible to interpret this picture as being due to tuberculosis.

## CASE 22532

## PRESENTATION OF CASE

*First Admission* A 20 year old American girl was admitted complaining of a draining sinus in the left chest.

Eleven years prior to entry the patient had an attack of bronchopneumonia following which she continued to have cough productive of light colored mucoid material amounting to about a half a cupful a day. There was some dyspnea on exertion but no orthopnea. About 2 years before entry the patient lost 10 pounds over a period of several months, became tired, weak and felt listless. X-ray examination showed fluid in the left chest and she entered a hospital where a tube was inserted into the pleural cavity. She remained in the hospital for 18 weeks and was kept in bed during that time for 3 months. She gained strength and was finally discharged with the tube still in place. It was not until 5 months after discharge that the tube was removed and following this there persisted a sinus tract which drained light yellowish fluid which occasionally was purulent in appearance. Pads were worn over this orifice and these required changing two to four times daily. Except for the inconvenience of the sinus the patient felt quite well and led an active existence.

The family history is noncontributory.

Physical examination showed a thin under developed girl lying flat in bed in no discomfort. She had an occasional nonproductive cough. There were a few shotty cervical nodes on the right side and some depression of the supraclavicular fossae. The trachea seemed to be in the midline. The entire left chest was dull anteriorly and posteriorly and the breath sounds were diminished to absent. Occasional crepitant rales were audible at the left base. Tactile fremitus and vocal resonance were diminished. On the right side the physical signs were normal. The cardiac impulse was felt in the right midclavicular line and the heart sounds, which were of good quality, were best heard in this region. No murmurs were heard. The tip of the spleen was palpable just beneath the left costal margin.

The temperature was 99.5°, the pulse 120. The respirations were 25.

Examination of the urine was negative. The blood showed a white cell count of 21,400 with a hemoglobin of 75 per cent. A smear of the material from the chest sinus showed many gram-positive diplococci with capsules. Cultures gave no growth.

X-ray examination of the right chest was negative. The entire left chest exhibited homogeneous dullness, more dense at the base than at the apex. The heart shadow was slightly displaced to the right but there was no displacement of the trachea. The interspaces on the



left were slightly narrowed and there was slight scoliosis. In the first interspace was a 2 centimeter round area of decreased density which had the appearance of a cavity with a fluid level. The trachea and the bronchi were well visualized and showed no gross variations from the normal. In the left lateral view there was no evidence of collapse of the lower lobe. The gas bubble of the stomach was not displaced. On deep inspiration there was a very slight shift of the mediastinum toward the dull side.

A thoracic paracentesis produced 14 ounces of foul purulent material. After one month x-ray examination showed a fluid level just above the diaphragm. The pleura was separated from the axillary border and there was gross dullness at the apex. The findings were considered to be significant of a large cavity with fluid occupying the entire right lung field. The pleural cavity was irrigated through the sinus tract for 3 days, during which time her temperature fluctuated up to 103°. Subsequently the eighth rib was partially resected and the empyema drained. Directly afterward the temperature dropped to normal and remained at that level throughout her hospital stay. Eleven days after operation another x-ray film showed reaccumulation of the fluid in the lower left cavity. Separation of the parietal and visceral pleura along the left axillary border was increased only slightly since the last observation. The fluid level noted in the upper chest was still present. The patient improved rapidly and was discharged on the thirteenth hospital day.

#### *Final Admission, 1 year later*

The patient had been followed in the Outpatient Department where she continued to improve and her weight increased. The drainage tube was kept in place and drainage of purulent material continued. X-ray examination 8 months after discharge showed that the dullness in the left side of the chest was considerably reduced. There was no evidence of undrained fluid. The pleura was markedly thickened and the lung irregularly expanded. There was an area of dullness in the region of the right middle lobe which was thought to be possibly due to a collapsed bronchiectatic lobe. The patient returned to work as a clerk and felt perfectly able to perform ordinary activity without fatigue. Three weeks before reentry she had a cold of moderate severity which subsided without complication. There was no chest pain, hemoptysis, dyspnea or night sweats. Her appetite was good and her bowel movements regular. The wound still drained a little and she entered the hospital for an obliterative operation.

Physical examination showed a fairly well-developed and nourished young woman in no discomfort. There was a draining sinus in the left posterior axillary line at the level of the

eighth rib. There was dullness posteriorly and laterally over the apex on the left side and impaired resonance over the remainder of that side. Breath sounds and voice sounds were diminished rather generally except at a point just medial to the tract where some resonance was elicited and breath sounds were bronchovesicular in character. No rales were heard. The heart was negative. The blood pressure was 124/80. The remainder of the examination was negative.

The temperature, pulse and respirations were normal.

Examination of the urine was negative. The blood showed a red cell count of 5,300,000, with a hemoglobin of 90 per cent. The white cell count was 13,600.

X-ray examination of the chest following the injection of lipiodol through the sinus tract showed an elongated cavity, the lower portion of which was filled with the lipiodol. The cavity, however, appeared to extend upward above this along the lateral chest wall to the level of the clavicle. The opaque medium did not enter the bronchi.

On the fourth hospital day the fourth, fifth, sixth and seventh ribs on the left side were partially resected and the pleura underlying them excised. A section of the latissimus dorsi was implanted within the pleural cavity. A smear from the empyema cavity showed gram-positive cocci in pairs and gram-negative bacilli. A culture showed fluorescent gram-negative bacilli. Following operation the temperature rose to 103°, the pulse to 110 and the respirations to 23. Throughout the remainder of her hospital stay her temperature continued to fluctuate irregularly up to 103°. On the ninth postoperative day an x-ray examination showed that the entire left lung field was dull except for a small area at the apex. No fluid level was visualized. The heart was not displaced. The patient responded well but complained of soreness in the chest wall. On the twentieth day the tube was removed and there was very little discharge. A month after entry the patient developed cough with which she raised about 1 to 2 ounces of colorless sputum daily. The wound appeared to be infected and was treated by dakinization with improvement. Two months after entry, however, a revision of the wound was performed. The intercostal muscle bundles were found to be thick, pale and edematous. These were resected and a Dakin's tube placed in the wound. Her condition improved somewhat and her temperature subsided but 2 weeks later irregular fever again occurred. The patient became irritable and restless and complained of continuous headache. Another x-ray of the chest at that time showed dullness along the lateral chest wall on the left side as previously described. There was now air between this and the slightly retracted lung but no evidence of retained fluid.

The heart was slightly displaced toward the right. The rib stumps showed evidence of marked osteoporosis but no definite evidence of osteomyelitis could be discerned. A neurologic examination showed early bilateral papilledema. The visual fields were normal. There was no nystagmus, visual weakness or other localizing cranial signs. The reflexes were hyperactive but symmetrical. A lumbar puncture showed clear colorless fluid with an initial pressure of 205. The dynamics were normal and the final pressure after removal of 10 cubic centimeters of fluid was 95. The total protein was 154 milligrams, chlorides 618, spinal fluid sugar 43, and a Wassermann test was negative. The cell count showed 61 white blood cells, 50 per cent polymorphonuclears and 50 per cent lymphocytes and monocytes. A few days later another neurologic examination showed clonus of the left ankle and a Babinski sign on the left side. Further spinal punctures revealed gradual increase of cells to 370 leukocytes. The total protein rose to 190 milligrams. A third nerve paralysis developed on the left side with dilatation of the pupil, lidlag and inability to contract the superior, inferior or internal rectus muscles. The patient became progressively weaker, drowsy and her speech appeared impaired. She gradually lapsed into coma and died 4 months after entry, 1 year and 4 months after the initial entry.

#### DIFFERENTIAL DIAGNOSIS

DR RICHARD H SWEET This is a girl of twenty who 11 years before entry, at the age of 9, had an attack of bronchopneumonia following which she had a cough productive of light mucoid material amounting to half a cupful a day. She had bronchopneumonia followed by a chronic pulmonary lesion which, of course, would make us think of bronchiectasis, possibly tuberculosis, or some chronic pulmonary disease. But about 2 years before entry she had another attack, characterized by loss of weight, when she felt tired, weak and listless. There is no story of pain, exacerbation of cough, or change in the character of the sputum.

She had pleurisy with effusion. We do occasionally see empyema of a very chronic sort following pneumonia which may go a year or more without a diagnosis being made, but I doubt very much if this episode had anything to do with her previous bronchopneumonia except that it might be secondary to the residual process following bronchopneumonia. Of course patients developing spontaneous pleurisy with effusion make one think of tuberculosis. The fact that she was operated on does not rule it out because I have seen patients operated on erroneously who had tuberculous effusion. They kept her in bed for a surprisingly long time, 3

months. In an ordinary pyogenic empyema the patient should be up after 2 or 3 weeks or less. She was in the hospital for about a month longer after getting up.

There is no note of what the x-ray showed at that time. It would have been a help to us. It strikes me as peculiar that she was in bed so long and also after having her tube in place for 9 months that she continued to have a persistent sinus. Of course, if this is an ordinary pyogenic empyema, the sequence of events is not uncommon. But one of the commonest causes of chronicity in a case of empyema is tuberculosis. In other words, many times we see patients who come in with a postpneumonic empyema, definitely proved to be such, which has become chronic and we do a thoracoplasty to give better drainage, and by doing a biopsy on the pleura we commonly find a tuberculous process. So I am always suspicious of any longstanding chronic empyema being tuberculous although other possibilities are foreign bodies, failure to leave the drain in a sufficient length of time, or inadequately placed drainage.

The chest signs are consistent with fluid or with a thickened pleura in addition. She may well have had a large spleen secondary to the chronic sepsis.

Culture showed no growth. This may not mean anything. It may not have been planted immediately.

The x-ray examination at this time showed that the right chest was negative. The entire left chest exhibited homogeneous dullness, more dense at the base than at the apex. All of these facts suggest possibly some fibrosis or atelectasis of the upper portion of the lung. This is the first note of any x-ray evidence of disease in the lung itself, so that we see definitely by the x-ray report that the lung and pleura were involved.

DR GEORGE W HOLMES This film taken before operation shows a rather characteristic appearance of fluid. It is interesting that the lung on the other side is perfectly normal. There is no evidence of fibrosis. After operation the edge of the partially expanded lung shows some pleural thickening with possible fluid at the base. The heart is in the normal position. A film taken after injection of an opaque mixture into the sinus failed to show evidence of communication with the bronchus.

DR SWEET The cavity is described as being in the lung field. Does that show here? In the first interspace there is a two centimeter round area of increased density according to this record. That area there has no lung markings. Is it fair to assume that that is a pulmonary cavity or is that fluid?

DR HOLMES I suppose you are thinking of tuberculosis. I do not believe that cavity is due to tuberculosis.

DR SWEET They obtained 14 ounces of foul purulent material. After a month the x-ray showed a fluid level above the diaphragm. The pleura was separated from the axillary border.

"The patient improved rapidly and was discharged on the thirteenth day." That puzzles me because as we read along, in spite of the fact that she had reaccumulation of fluid we find she went home feeling much better. I presume the tube became plugged up and the empyema backed up. She was discharged presumably in good condition although we have no note as to how she was or of the amount of sputum, or even of the presence of sputum. There is a history of dullness in the region of the right middle lobe which could be due to collapsed middle lobe.

DR HOLMES In going through the films I did not correlate them.

DR SWEET So now we have a picture of chronic empyema given adequate drainage at the second operation here at this hospital the patient having done well with the exception that the empyema had not healed. My first impression that she had an intrapulmonary process in addition to a pleural process seems to be erroneous as demonstrated by the x-ray film. The physical signs were consistent with an old empyema cavity. As Dr Holmes pointed out there was no bronchial communication and the lung showed no involvement.

DR HOLMES I suppose I should have said no bronchial communication was demonstrated. There is no evidence of it.

DR SWEET "On the fourth hospital day the fourth to seventh ribs on the left side were partially resected and the pleura underlying them excised, and so forth." That is an operation which we do sometimes for persistent chronic bronchial fistula after lung abscess and sometimes for chronic empyema. The x-ray I thought was going to show an empyema cavity going up as far as the clavicle as they described it, but apparently it was localized and that explains the apparent discrepancy between the report of the x-ray and the size of the operation.

Obviously she had a septic wound following the operation. That is the first thing you would think of under any circumstances. This matter of sputum has been very difficult for me to follow throughout this whole history. At one point in the first paragraph we might assume she had sputum throughout the whole history but during the period of observation in the Outpatient Department no mention is made of sputum. Now we have mention of sputum 1 month after the operation which would suggest that something new had happened, something involving the lung.

Of course that first rapid rise in tempera-

ture, pulse and so on, showing evidence of infection, may have been due to the intrapulmonary process which she must have had, because she developed a sputum, or it may have been due to the wound. I would personally be very suspicious of the wound. The intercostal bundles at this revision of the wound were thick, pale, and edematous. I do not believe that means anything. The temperature subsided after operation so the trouble was apparently in the operative wound. If she had something in the lung, abscess, bronchopneumonia, or something of that sort without external drainage I should think it would have continued and the temperature and signs of infection would not have subsided, but now we have another aspect to the case.

"Her condition improved somewhat and her temperature subsided, but 2 weeks later irregular fever again occurred." Apparently the house officer or someone had thought the patient had osteomyelitis of the ribs to explain this fever.

With the headache and with this early bilateral papilledema we must begin to suspect a complicating cerebral lesion. Of course a metastatic brain infection from pulmonary or pleural disease is relatively frequent. I am not particularly expert at interpreting these figures on the lumbar puncture, but I should think they would be consistent with a reaction in the spinal fluid to a neighboring infection. Or they might go with tuberculous meningitis although the white count is not typical.

I presume there is no particular need to make this case very complicated. The only thing is to explain why she developed this empyema 9 years after having had bronchopneumonia. We have no knowledge as to what she did during the interval between the bronchopneumonia and the development of empyema except that she had a cough with sputum. The empyema came on rather gradually. At any rate our first definite knowledge of her shows her as a case of chronic empyema without pulmonary damage, which is different from my first impression. But assuming that that is the case, then the rest of the picture becomes rather clear. She had this chronic empyema and following the operative attempt to obliterate the cavity things went badly. She had infection in the wound, and may have had infection in the lung following the operative interference, with finally a metastatic involvement of the brain and, I should presume, brain abscess.

DR TRACY B. MALLORY I think we ought to give Dr Sweet one additional piece of information, one which his discussion shows he would have looked for and one which was given to the surgeons but they refused to take it. On the occasion of this revision of the operative wound

they excised the intercostal muscles and we found in them foci of calcification and a great many collections of foreign body giant cells in arrangement so suggestive of tuberculosis that we reported it flatly as tuberculosis. The surgeons then came over and said that it could not be tuberculosis and asked us to reconsider our diagnosis. We reconsidered, lost our courage a little bit, and said perhaps it was not tuberculosis, but that we would like to have a little more material to put into a pig.

DR SWEET Before I started the discussion my diagnosis was tuberculous empyema with tuberculous meningitis. There are many things consistent with that diagnosis, some of which are the failure of operation, the persistent empyema which is so common with tuberculosis, and the failure of thoracoplasty which is almost invariably successful except in the presence of tuberculosis. I was swung from that diagnosis by the x-ray which seemed to prove the absence of evidence of tuberculosis, but with even suggestive histologic support I prefer to return to it.

#### CLINICAL DIAGNOSES

Chronic empyema  
Brain abscess  
Infection of chest wall

#### DR RICHARD H. SWEET'S DIAGNOSES

Tuberculous empyema  
Metastatic tuberculous meningitis

#### ANATOMIC DIAGNOSES

Tuberculous empyema  
Tuberculosis, pulmonary, healed apical  
Tuberculosis of bronchial and retroperitoneal nodes  
Meningitis, tuberculous  
Pulmonary atelectasis  
Congenital absence of the middle lobe of the right lung  
Parovarian cysts, left

#### PATHOLOGIC DISCUSSION

DR MALLORY We found at autopsy no evidence of a cavity in the lung. There was, however, old healed tuberculosis at the left apex and there were in the lower portions of the left lung some fairly fresh tubercles. There were large caseous hilar glands. We also found scattered miliary tuberculosis in the liver and spleen and basilar tuberculous meningitis without any solitary tubercle in the brain, so that the involvement of the basal cranial nerves was presumably due to the meningeal involvement.

DR HOLMES Was there any evidence of tuberculosis in the contralateral lung?

DR MALLORY No.

DR SWEET One of the things that I have been tremendously impressed by is the frequency of tuberculosis in chronic empyema in the absence of demonstrable tuberculosis. This case is exactly in line with a number of cases I have seen.

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## PRONTYLIN AND PRONTOSIL

THE newspapers are crediting "prontylin" and "prontosil" with power to overcome the effects of the invasion of the human body by streptococci.

These drugs are "produced by a linkage of azo dyes with a sulphonamide group." Prontylin is intended for peroral use and prontosil is administered by the intramuscular route or directly into the peritoneal cavity according to the special indications. Prontosil is the more powerful of the two.

According to the published reports these drugs are efficacious in certain streptococcal infections and to a lesser degree in combating staphylococci. Experiments have also been made in the use of these drugs in other specific infections. It has been stated that they are not effec-

tive against *Streptococcus viridans*. Credit for the demonstration of the efficacy of these drugs has been given to Domagk, a disciple of Professor Heinrich Hoeferle, director of pharmaceutical research for the Interessengemeinschaft.

The results of Domagk's studies were published in 1935<sup>1</sup> and the early application of his work was carried on by German and English research workers and clinicians. In the United States studies have been made of the use of these drugs in many places especially at Johns Hopkins, the Presbyterian Hospital in New York and several hospitals in Boston.

Published clinical results are far from convincing to one that is inclined to be skeptical. According to Colebrook and Kenny<sup>2</sup> the articles in the German literature do not state whether all cases were infected with hemolytic streptococci, whether blood stream invasion was present or whether serious complications, such as peritonitis existed. These English authors<sup>2</sup> report on the treatment with prontosil of thirty eight cases of puerperal sepsis. Only three cases died a mortality of 8 per cent, whereas the expected mortality, based on statistics of the immediately preceding years, was 22 per cent.

It must be borne in mind that the virulence of streptococci varies tremendously from year to year even from month to month and that the only way to evaluate properly a therapeutic agent of this sort is by the "alternate case method." Furthermore, only six of the cases in this series had hemolytic streptococci in the blood stream and, of these, three died, a mortality of 50 per cent. It should also be noted that some of the patients showed transient toxic effects to the drug and that three developed sulphhemoglobinemia.

There is no report of consideration of the efficacy of these compounds by the Council on Pharmacy and Chemistry of the American Medical Association at the present time, and it would be well for the medical profession to leave further trial of them to competent observers even though statements of reputable physicians are impressive.

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- 2 Colebrook L and Kenny M. Treatment of human puerperal infections and of experimental infections in mice with prontosil. Lancet 1:1-79 (June 6) 1936.

## REPORT OF THE SPECIAL HEALTH COMMISSION

As a result of the report of the State Health Commission appointed in 1935 by an act of legislature far reaching revisions of this State's health laws will be sought at the coming session.

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## THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

WHITE, PAUL D A B M D Harvard University Medical School 1911 Physician Massachusetts General Hospital Lecturer in Medicine, Harvard University Medical School His subject is "The Study and Treatment of Heart Disease at the Massachusetts General Hospital from 1821 to 1936" Page 1261 Address Massachusetts General Hospital, Boston Mass

MASSELL, BENEDICT F A B, M D Harvard University Medical School 1931 Resident Physician, House of the Good Samaritan Assistant in Medicine, Harvard University Medical School, and Beth Israel Hospital Graduate Assistant in Medicine, Massachusetts General Hospital Address 25 Binney Street Boston Mass. Associated with him is

JONES, T DUCKETT B A, M D University of Virginia School of Medicine 1923 Research Director, House of the Good Samaritan Assistant in Medicine, Massachusetts General Hospital Instructor in Medicine, Harvard University Medical School Address 25 Binney Street Boston, Mass Their subject is "Evaluation of the Signs of Active Rheumatic Fever with Especial Reference to the Erythrocyte Sedimentation Rate and Leukocyte Count" Page 1269

TAYLOR, GRANTLEY W A B, M D Harvard University Medical School 1922 F A C S Assistant in Surgery, Harvard University Medical School Assistant Surgeon, Massachusetts General Hospital Associate Staff Surgeon Palmer Memorial Hospital Surgeon, Collis P Huntington Memorial Hospital Visiting Surgeon House of the Good Samaritan and Pondville Hospital Consulting Surgeon, Massachusetts Eye and Ear Infirmary His subject is "Carcinoma of the Breast in Young Women" Page 1276 Address 264 Beacon Street, Boston, Mass

INGALLS, THEODORE HUNT A B M D Harvard University Medical School 1933 Medical House Officer, Peter Bent Brigham Hospital, 1934-1935 William Hunter Workman Fellow of Harvard University Medical School Research Fellow in Pediatrics, Harvard University Medical School and The Infants' and The Children's Hospitals, 1935-1937 His subject is "The Role of Scurvy in the Etiology of Chronic Subdural Hematoma" Page 1279 Address 300 Longwood Avenue Boston, Mass

CASEY, JOHN F M D College of Physicians and Surgeons, Columbia University 1909 Visiting Physician St Elizabeth's Hospital Consulting Physician, Leonard Morse Hospital His subject is "Brucellosis (Undulant Fever)—In-

teresting and Important Facts About the Disease with the Report of a Severe Case Occurring in a Boston Physician" Page 1282 Address 475 Commonwealth Avenue, Boston Mass

KUGELMASS, I NEWTON M A, Ph D, Sc D, M D Yale University Medical School 1925 Director Pediatric Research, Fifth Avenue Hospital, New York Director, Heckscher Institute for Child Health, New York Associate Attending Pediatrician, Fifth Avenue Hospital, New York Attending Pediatrician, Broad Street Hospital, French Hospital, New York City Children's Hospital Consulting Pediatrician, Monmouth Memorial Hospital, Long Branch, Lynn Memorial Hospital, Sussex, Muhlenberg Hospital, Plainfield, New Jersey His subject is "Milk Modification and Infant Constitution" Page 1285 Address 1060 Park Avenue, New York City

BURBANK, L W B S, M S, M D University of Vermont College of Medicine 1896 President, Vermont State Medical Society, 1935-1936 His subject is "Medical Service in Vermont Some Changes in Forty Years" Page 1292 Address Cabot, Vermont

## MISCELLANY

## CONNECTICUT NEWS

## STANDING ORDERS AND POLICIES FOR PUBLIC HEALTH NURSES

This pamphlet appears as a revision of Guidance for Public Health Nurses and was endorsed and approved by the House of Delegates of the Connecticut State Medical Society September 23 1936 These standing orders should insure adequate nursing care in any community since they provide for nursing care in families where no physician is in attendance or where the attending physician has left no orders for the nurse They also provide a guide in health supervision services as afforded by the public health nurse during periods of maternity and infancy and in public health education for pre-school and school children and adults As far as is known Connecticut was the first state where the Department of Health and the Medical Society gave joint approval to public health nursing orders and policies

## WATER AND SEWAGE IMPROVEMENTS

On October 7 1936 a new chlorination plant was placed in service on the Jewett City Company system This supply was one of the largest untreated surface waters in the state furnishing water to approximately 3 000 persons The Unionville Water Company installed temporary chlorination on its untreated surface supply on September 4 1936 in anticipation of new permanent chlorinating equipment now being installed Several other chlorinators in

of the Legislature. The first section of the special commission's report has recently been made public by the Commissioner of Public Health, and more will be forthcoming.

Recommendations will be made that uniform state wide regulations for the isolation and quarantine of communicable diseases be adopted, that unreasonable restrictions on burials following deaths from communicable diseases be abolished, that health departments be given authority to control persons suspected of spreading infection, and be held responsible for the conduct of adequate programs for vaccination against smallpox and immunization against diphtheria. It will also be recommended that the control of venereal diseases be made a state, rather than a local, function.

The control of tuberculosis takes up a major part of this first section of the commission's report, with many recommendations concerning it. One of the most important of these has to do with the regular examination of school teachers. It is furthermore recommended that county tuberculosis sanatoria eventually be placed under state supervision, with an ultimate discontinuance of all municipal tuberculosis hospitals except the hospital in Boston.

It may be pertinent, in discussing this report, to direct some attention to the manner in which it came into existence, to point out that it is the result of a survey consuming over a year's time and covering every important point with a bearing on the public health, made by an unpaid commission of several scores of interested and loyal professional individuals, largely physicians.

The labor was monumental, exact and inclusive, yet the task was so well organized and coordinated, with committees and subcommittees, that no undue burden was thrown on any group or on any individual.

The impressive fact concerning it is that in a period of more or less gross materialism, when few political acts are performed without some ulterior motive, a group of citizens should so willingly give of their time and of their ability to a valuable performance carrying with it no reward and no opportunities for self-glorification. The Massachusetts Medical Society should be congratulated that its membership figured so largely in this public-spirited enterprise.

### CRIMINAL ABORTIONS AND REPUTABLE PHYSICIANS

THE activity of the criminal abortionist is a social menace and against it the statutes of the Commonwealth offer a certain amount of protection by prescribing punishment for the offender, if convicted. How widespread the activity is, no one can tell accurately, but the effects in

morbidity and mortality are worth careful study.

It is a disturbing social phenomenon that so few criminal abortionists are convicted in court, yet the reasons are not hard to find. The pregnancy is an unwanted pregnancy and relief from the pregnancy brings relief from social problems which may prove in the highest degree embarrassing. The woman is not likely to repay her deep obligation, as she regards it, by doing anything that will cause trouble for the person who has helped her, and often if trouble comes to herself she will say, on advice, that the abortion was self-induced.

When the unmarried daughter in a family is about to die or has died, as the result of the offices of a criminal abortionist, there is often furious indignation that the murderer should be permitted to escape. Yet even such slight evidence against the criminal as the family may have is often withheld, because, they say, they do not want the publicity and it will not help the daughter who is gone. Even the argument of possible protection to other daughters is of no avail.

It is noteworthy that many of these women come under the care of a reputable physician before death finally closes the incident. What is the duty of the physician?

First of all, of course, it is to do his utmost to restore the patient to health, if possible. But is that all? Has he no duty as regards the person who committed the crime? Does his consecration to the care of the sick include protection to the criminal? Would it not be at least part of preventive medicine to assist in protecting other persons?

The harm done by the criminal abortionist has reached such proportions that there are some persons who advocate the compulsory reporting by physicians of all abortions, just as every gunshot wound is required by law to be reported, if the patient comes to a physician for treatment.

It may be that the compulsory reporting of abortions would not be necessary or wise or even expedient. But at the present time there seems to be a widespread indifference on the part of reputable physicians, in the matter of preventing criminal abortions, for they offer no assistance looking toward the apprehension of the abortionist. Would it be too much to ask that in case a criminal abortion is suspected, the physician consult the medical examiner promptly instead of waiting until the death of the patient? It may be that no lives could be saved by calling the attention of the medical examiner to these patients when once blood-poisoning has gained control of the body, but if even a few other deaths could be prevented by checking the abortionist, a distinct service to humanity would be rendered.



lective farms playgrounds camps and sanitarium Dr Pierson tells us that there is a sense of calm and security in Soviet Russia and she ascribes this to the medical care free education (including college education with extra spending money) and age protection and the assurance of a job provided by the State

#### HARTFORD SHOWS DROP IN APPENDICITIS MORTALITY

Hartford's appendicitis death rate dropped sharply during the past year and was lower than that of most other cities in the country according to a national survey conducted by Dr. Frederick L. Hammon. The city's record for 1935 was 10.7 per 100 population and in 1934 it was 10.9. The national average based on studies in 180 cities was 14.1 in 1935 as compared with 16.2 in 1934. The national figures are the lowest since 1918.

#### INFANT MORTALITY

Of the four large cities in Connecticut New Haven Bridgeport Waterbury and Hartford the latter showed the highest average infant mortality rate for the years 1931 to 1935 inclusive. This situation is being used as one of the strongest arguments for the need of a Bureau of Child Hygiene within the City Board of Health in Hartford. The figures follow:

Bridgeport	43.9 per 1000 population
Hartford	64.4
New Haven	44.1
Waterbury	53.2

#### WELFARE DEPARTMENT IMPROVEMENT PROGRAM

The Public Welfare Commission of Hartford has submitted to the Board of Finance a ten-year improvement program which includes three major undertakings: Reconstruction of the Isolation Hospital at a cost of \$297,553; building of a nurses home at \$200,000; construction of an emergency lighting system for all institutions in the municipal hospital group at \$500,000. The present Isolation Hospital a wooden structure erected 20 years ago for a 5-year period is a fire hazard a financial white elephant, and entirely inadequate. Eighty per cent of the nurses in the hospital group are at present compelled to live outside because of lack of accommodations. An emergency lighting system is needed to insure heat in event of power failure. This was very apparent to all during the recent disastrous flood.

#### VIENNA PHYSICIAN DISCUSSES INSULIN TREATMENT IN DEMENTIA PRAECOX

Dr. M. Sakel of the University of Vienna the discoverer of the so-called insulin shock treatment for dementia praecox, recently visited the Neuropsychiatric Institute of the Hartford Retreat. A conference was held on this form of treatment and there were present in addition to Connecticut's leading psychiatrists members of the faculties of Yale

Columbia and Cornell Universities and the University of Munich.

Dr. Fritz Kant, associate professor of psychiatry at the University of Munich, has been appointed research associate at the Institute. He has been placed in charge of the evaluation and research involving investigation of insulin therapy in dementia praecox.

#### HEAD OF ST FRANCIS HOSPITAL, HARTFORD, DIES

Mother Ann Valencia, head of St. Francis Hospital since its establishment in 1887, died in that institution November 29, 1936, at the age of 81. She was a most remarkable woman. Slight of body but in dominant of spirit she was possessed of a keen mind that grappled with the problems of her institution. Mother Valencia entered the Order of the Sisters of St. Joseph at the age of 14 and was credited with having contributed the largest individual share to the growth and success of St. Francis Hospital. Until the very end her keen mind enabled her to issue orders to her subordinates as usual. Throongs found their way to the chapel where she lay in state to kneel at her bier. In the passing of this brilliant soul the city and state have lost an untiring worker of extraordinary ability.

SEXTON. Lewis A. Sexton, M.D., aged 60 years, who gained national reputation as a hospital administrator through his service as superintendent of the Hartford Hospital for nearly 20 years, died at his home at midnight December 2, 1936, after a long illness. In September Dr. Sexton was obliged because of ill health to relinquish his post as head of the hospital and at a meeting on September 20 was named director emeritus. The post of superintendent was discontinued and Dr. Wilmar Mason Allen was appointed director of the hospital. As director emeritus Dr. Sexton continued to act in a consulting and advisory capacity.

From 1899 to 1901 Dr. Sexton was a student in the academic and pharmacologic departments of Vanderbilt University, Nashville, Tenn. He received his M.D. from Vanderbilt University in 1906. From 1901 to 1902 he served as assistant chemist of the Spurlock Neal Company in Nashville.

He interned at Nashville City Hospital from 1906 to 1907 and from 1907 to 1908 at Riverside Hospital, New York City. From 1908 to 1914 Dr. Sexton served as resident physician at the Willard Parker Hospital, New York City.

Before coming to Hartford he served as assistant superintendent of Johns Hopkins Hospital, Baltimore, Md., for 3 years from 1914 to 1917.

During the time of his administration of the Hartford Hospital the number of beds at the hospital grew from 400 to 780 beds until at present it is one of the largest private general hospitals in the country.

The Woman's Building, the Crane Building, the Hall Wilson Laboratory for research, the Capewell X-Ray Building, the Barne, Educational Building,

stallations are under way The new sewage treatment plant at Uncas-on-Thames, State Tuberculosis Sanatorium, was placed in operation on October 5, 1936 This plant comprises coarse bar screen, sedimentation tanks of the Imhoff type glass-covered sludge drying beds and chlorinator

#### CONNECTICUT PUBLIC HEALTH ASSOCIATION

The Connecticut Public Health Association met in Waterbury on December 16, 1936 The morning session was given up to a symposium on pneumonia and included among the speakers Francis G Blake, MD, Professor of Medicine Yale University School of Medicine and Joseph I Linde, MD, Health Officer of New Haven In the afternoon syphilis was considered with R. A Vonderlehr, MD, Assistant Surgeon General, USPHS John L Rice, MD Health Commissioner, New York City, and several local authorities as speakers The talkie movie 'For All Our Sakes' previously reviewed in Hartford, was presented at the close of the program

#### OUTBREAK OF BACILLARY DYSENTERY

Bacillary dysentery recently appeared in an institution in Hartford Forty two inmates were afflicted and the duration of illness varied from 1 to 4 days Paratyphoid bacilli (Flexner type) were isolated from the stools of the cook and one of the kitchen helpers This outbreak serves as an excellent example of the necessity of education of all food handlers as to the proper personal hygiene

#### HAZARDOUS OCCUPATIONS

The State Factory Inspection Department for 1934-1935 showed that Hartford factories employed 24,653 persons exclusive of clerical help This is 36 per cent of all persons gainfully occupied in that city There are known to exist in the United States over 700 hazardous occupations and approximately 500 of these occur in Hartford The protection of health of those engaged in industry against an injurious occupational environment is a responsibility of public health authorities The expectancy of life of industrial employees has been shown to be about 7 years less than that of the average person

#### EXPANSION OF HARTFORD HEALTH BOARD

Dr Benjamin G Horning recently appointed Health Officer in Hartford is planning a reorganization and expansion of the Health Department Two new bureaus Child Hygiene and Nursing and the reorganization of the Bureau of Inspection together with the addition of ten persons to the department's personnel, are proposed in the 1937-1938 budget estimates

#### PLAN PROPOSED FOR MEDICAL CARE OF AUTOMOBILE ACCIDENT VICTIMS

Dr Charles W Comfort of New Haven has drafted a plan to be presented to the Financial Responsibility Commission This plan provides for a State

fund which would guarantee the payment of medical and hospital fees for the victims of automobile accidents when the motorist at fault is not financially responsible It will require an additional registration fee for the automobile owner who carries no insurance and cannot show financial responsibility in other ways The fund would also provide compensation to the victim for loss of time from work The State, in turn, would have a claim against the motorist causing the accident and could refuse to grant him the right to drive again until he had reimbursed the State for payments made The State might also collect from the motorist by a lien on any judgment returned against him The Financial Responsibility Commission was expected to complete its report to the Governor in December Organized medicine in Connecticut is opposed to compulsory liability insurance such as now exists in Massachusetts

#### OPTOMETRISTS SEEK EYE TESTS

The optometrists are said to be making a brave effort to secure annual eye examinations for every car driver before driving licenses are issued They claim that nearly 50 per cent of driving accidents are due to visual defects Stereopsis or depth perception, and peripheral vision are of more importance to the driver than visual acuity

#### NARCOTICS DESTROYED

Three bushels of narcotic drugs, some of it taken from addicts who acquired it in illegitimate ways and more of it turned in to the State Department of Health as damaged or outdated stock of physicians and druggists, will be consigned officially to the furnace Much of this housecleaning has been made possible under the new uniform narcotic act adopted by the General Assembly in 1935 Some packages of narcotics turned in bear Spanish American War stamps This stock represents in some cases unopened pharmacy products, narcotics damaged by the recent flood and unwanted goods left behind when a pharmacist or physician has gone out of business or practice

#### MARLBOROUGH GETS NEW MEDICAL EXAMINER

Dr Edwin Griswold of Glastonbury has been appointed Medical Examiner of Marlborough by Coroner Frank E Healy This appointment was made possible by the resignation of Dr Lee J Whittles from the Marlborough position Dr Whittles has been medical examiner for both Marlborough and Glastonbury for 13 years He will continue to serve Glastonbury

#### DR PIERSON ON RUSSIA

Dr Emily Pierson, health officer of Cromwell is becoming a frequent lecturer on Soviet Russia Dr Pierson spent one year at the University of Moscow studying education and medicine and another year in travel throughout Russia observing various Soviet institutions She presents moving pictures of schools, colleges, nurseries, churches factories col

lective farms playgrounds camps and sanitarium Dr Pierson tells us that there is a sense of calm and security in Soviet Russia and she ascribes this to the medical care free education (including college education with extra spending money) old age protection and the assurance of a job provided by the State

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He was instrumental in getting all insurance companies together to make a free survey of fire hazards in hospitals and through his efforts special policies and rates were drawn up. This move was made by insurance companies after an x ray explosion in a Cleveland hospital caused a fire in the hospital and the death of several persons.

Dr Sexton had the unusual honor of being named a member of the National Hospital Day Committee, consisting of 10 prominent physicians to confer with former President Hoover on plans for National Hospital Day which is observed May 12.

At the time of his death, Dr Sexton was president of the American Hospital Association a position he had held for some time. He was former president of the New England Hospital Association, the Connecticut Hospital Association and was a member of the American Medical Association, Connecticut Medical Society and Hartford Medical Society and was an honorary member of the Western Hospital Association. His clubs included Farmington Country, Twentieth Century, Hartford Gun, Connecticut Historical Society, Sons of the American Revolution, East Glastonbury Fish and Game Association, Camp Fire Club of America, Phi Kappa Psi and Phi Chi. For some time he was a champion pistol shot.

Dr Sexton was born March 25 1876, in Tennessee, a son of the late William Robert and Mary (Sparkman) Sexton. He was married to Henrietta Stenz of New York City April 19, 1916.

**O'BRIEN** Thomas F O'Brien, M.D., aged 52 years, former acting health officer of the city of Hartford and a member of the medical staff of St Francis Hospital for many years died at his home on November 30, 1936 after a long illness. He was born January 4, 1884, in Bridgeport a son of Julia Agnes Ryan O'Brien and the late Timothy Peter O'Brien. After his elementary education, Dr O'Brien had to struggle for his higher learning, finding it necessary to attend night school. At the age of 13, he went to work as cash boy in Reads Department Store.

Seven years afterward, he entered St. Vincent's Hospital in Bridgeport, which had just opened, and became one of the first graduates of the hospital in 1907. In a short time he entered the Mills Training School for male nurses at Bellevue Hospital New York for postgraduate work.

Lacking the prerequisites for entering a medical school, Dr O'Brien practiced nursing in New York and Boston for some time and took courses paralleling high school courses. He was admitted to the College of Physicians and Surgeons in Baltimore, Md and in 1916 obtained his medical degree there.

Through friendship with a fellow student, a Hartford man Dr O'Brien came to this city to intern at

St Francis Hospital. Completing a year's work at the hospital, he did considerable orthopedic work in New York and, at the outbreak of the World War, he was assistant superintendent of Undercliff Sanatorium in Meliden.

During the war Dr O'Brien was a Lieutenant junior grade, in the navy and served on the U.S. transport Neponset as ship's doctor. After the armistice he made ten trips on the transport Olive which was engaged in returning soldiers to the country.

Soon after his discharge from the navy, he became superintendent of Seaside Sanitarium Niantic, where he remained until May, 1920.

In this period, Dr O'Brien married Hilda Louise Stickney of Hartford whose father was for many years in charge of Trinity College Commons. Dr and Mrs O'Brien moved to Hartford, and from 1920 until 1934, he maintained a general practice here and served on the staff at St Francis Hospital.

Dr O'Brien entered the Health Department August 24, 1934 when he was appointed assistant superintendent and epidemiologist. When Superintendent C P Botsford retired in October, 1935, Dr O'Brien became acting superintendent, a post he held until April this year. Dr R V Boyce, then Health Board president became acting superintendent and Dr O'Brien was given an indefinite leave of absence because of ill health.

Dr O'Brien was a member of Rau Locke Post American Legion Hartford Council and Bishop Mc Mahon Assembly, Knights of Columbus, Bridgeport Lodge of Elks and the American Public Health Association.

He leaves his widow his mother (Julia A O'Brien Canny), of Bridgeport two daughters, Mary Elizabeth and Hilda Frances O'Brien, two brothers, Joseph O'Brien and William Canny, of Bridgeport two sisters, Mrs R W Keeley, of Windsor, Ont., Canada, and Mrs Raymond Maurel, of Point Barrow Alaska and several nieces and nephews.

#### HARTFORD HOSPITAL

At a dinner given recently in his honor as the newly appointed director of the Hartford Hospital by the managing directors and staff members Dr Wilmar M Allen presented the three main problems that he considered the Hartford Hospital faces in the immediate future. First how to provide medical care to all persons at a price that they can afford to pay secondly, how to prevent the abuse of charity toward the medical profession and the hospital and thirdly, how the Hartford Hospital can carry out these aims. In offering a solution for the first problem Dr Allen suggested that it may be necessary to provide medical care on an insurance basis.

The Annual Meeting of the Hartford Hospital was held on November 12 1936. Mr Louis R Cheney was again named president of the hospital. The staff elected included a few changes and additions viz consulting pathologist and bacteriologist Dr

Wilmar M. Allen, anesthetist, Dr. Ralph M. Tovell, pathologist and bacteriologist, Dr. Ralph E. Kendall, clinical assistant physician, Dr. Lawrence P. Coggswell, clinical assistant ophthalmic surgeon, Dr. Arthur C. Unsworth, clinical assistant pediatrician, Dr. Frank P. Rogers, clinical assistant surgeon at large, Dr. Sidney S. Quarrier.

#### UNIVERSITY OF HEALING ARTS CLOSES

The University of Healing Arts opened in Hartford a little more than a year ago as a school of drugless healing, suspended all instruction November 9, 1936, after State Health Commissioner Osborn had informed members of its faculty that they were violating a state law. Announcement of the suspension was made to the seventeen students the same day at the university's headquarters and announced publicly that evening by Dr. K. C. Hitchcock, secretary of the school. The decision followed receipt of legal advice from the school's counsel. It is understood that the school will attempt to put its affairs in order so that it may reopen.

Dr. Osborn called attention to violation of Section 2740 of the General Statutes of Connecticut which states that "no person shall give or attempt to give training in any branch of the healing arts or any subdivision thereof or aid or participate in the same without first having received permission to do so from the General Assembly."

The catalogue of the University announced courses in naturopathy, chiropractic, physical therapy and massage. All the students recently enrolled of whom half are girls are said to be studying naturopathy. The school is not recognized by either the chiropractic or the naturopathic examining boards. According to the catalogue, tuition fees are \$200 a year in advance or \$225 in installments, with an additional matriculation fee of \$25 for students of naturopathy and chiropractic, a breakage deposit fee of \$10 of which any balance would be refunded at the end of the school year, and variable laboratory fees "usually not exceeding \$25 a year."

#### NEUROPSYCHIATRIC INSTITUTE OF THE HARTFORD RETREAT

This hospital, the oldest of its kind in Connecticut and the third oldest in the United States, is entitled to exemption from taxation by the City of Hartford according to a ruling recently made by the Assistant Corporation Counsel. The Retreat has always been exempt from taxation since its establishment 114 years ago, but in June 1936 the Assistant Corporation Counsel advised the assessors by letter that in his opinion the Retreat was not entitled to that exemption. Now, after a more careful study of the facts, we find a reversal of opinion in the final conclusions reached by the Assistant Corporation Counsel.

#### THE MENTALLY DEFICIENT

Governor Cross has received a discouraging view of the burden of care for the mentally deficient in

the report rendered by the Commission appointed to purchase the site for Connecticut's second hospital and training school for mental defectives. Experts estimate that two hospitals of the size of Mansfield, providing beds for 1,200 each, will not be sufficient to cover the need. A conservative estimate puts the number of mental defectives at 16,000 in Connecticut. Of these 5,000 are said to require custodial care.

The danger of leaving such cases at large is often underestimated. New Haven has seen in recent years two murders perpetrated by youths of low mental capacity. The Jail Farm Commission in 1934 found that 33.2 per cent of the jail population was either feeble-minded or on the border line.

#### HOSPITALIZATION OF INCURABLES

Connecticut is now having its attention brought to its lack of facilities for caring for its incurables. That such a group is just as deserving of public provision as are the insane, the feeble-minded and the tuberculous cannot be gainsaid. A number of states, notably Massachusetts and New York, have met the problem by providing State Hospitals for incurables. The situation is far more serious than the public in this State realizes.

**BOUCHER.** James J. Boucher, M.D., aged 61 years, secretary of the Hartford Board of Education, was killed in Columbia on November 14, 1936, by the discharge of a gun accidentally fired as he fell in an attempt to scale a wall while hunting. Death was instantaneous. Dr. Boucher was born in East Windsor, received his primary education there, studied at Harvard University and graduated from the College of Physicians and Surgeons in Baltimore, Maryland. He served his internship at St. Joseph's Hospital, Baltimore. He began practice in Hartford with his brothers and formerly was associated with one of them at the Wilson Sanatorium. Dr. Boucher was a member of St. Francis Hospital surgical staff for thirty years and was consulting surgeon to Mt. Sinai Hospital at the time of his death. He was a member of many medical organizations, of the American College of Surgeons, of the Hartford Lodge of Elks and of the Hartford Council, Knights of Columbus. Dr. Boucher leaves his wife, four daughters and two brothers. Out of respect the elementary schools of Hartford were closed for one half day and the high and junior high schools all day on November 17.

**THOMAS C. HODGSON,** M.D., has been appointed health officer of Berlin to fill the unexpired term of Matthew H. Griswold, M.D.

**HAROLD T. OESAU,** M.D., has been appointed acting health officer of Stratford due to the death of Dr. Ruyter Howland, M.D.

**FRANK M. DUNN,** M.D., has been appointed health officer of Waterford to fill the vacancy caused by the death of Ross E. Black, M.D.

for Nurses, the Cheney Memorial Library and the Ingalls Building were all added to the hospital while he was superintendent.

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At the time of his death Dr Sexton was president of the American Hospital Association, a position he had held for some time. He was former president of the New England Hospital Association, the Connecticut Hospital Association and was a member of the American Medical Association, Connecticut Medical Society and Hartford Medical Society and was an honorary member of the Western Hospital Association. His clubs included Farmington Country, Twentieth Century, Hartford Gun, Connecticut Historical Society, Sons of the American Revolution, East Glastonbury Fish and Game Association, Camp Fire Club of America, Phi Kappa Psi and Phi Chi. For some time he was a champion pistol shot.

Dr Sexton was born March 25 1876 in Tennessee, a son of the late William Robert and Mary (Sparkman) Sexton. He was married to Henrietta Stenz of New York City April 19 1916.

**O'BRIEN** Thomas F O'Brien M.D. aged 52 years, former acting health officer of the city of Hartford and a member of the medical staff of St Francis Hospital for many years died at his home on November 30, 1936, after a long illness. He was born January 4, 1884, in Bridgeport, a son of Julia Agnes Ryan O'Brien and the late Timothy Peter O'Brien. After his elementary education, Dr O'Brien had to struggle for his higher learning finding it necessary to attend night school. At the age of 13, he went to work as cash boy in Reads Department Store.

Seven years afterward he entered St. Vincent's Hospital in Bridgeport which had just opened, and became one of the first graduates of the hospital in 1907. In a short time he entered the Mills Training School for male nurses at Bellevue Hospital New York, for postgraduate work.

Lacking the prerequisites for entering a medical school, Dr O'Brien practiced nursing in New York and Boston for some time and took courses paralleling high school courses. He was admitted to the College of Physicians and Surgeons in Baltimore Md and in 1916 obtained his medical degree there.

Through friendship with a fellow student, a Hartford man, Dr O'Brien came to this city to intern at

St. Francis Hospital. Completing a year's work at the hospital, he did considerable orthopedic work in New York and at the outbreak of the World War, he was assistant superintendent of Undercliff Sanatorium in Meliden.

During the war, Dr O'Brien was a lieutenant, junior grade, in the navy and served on the U.S. transport Neponset as ship's doctor. After the armistice he made ten trips on the transport Olivia which was engaged in returning soldiers to this country.

Soon after his discharge from the navy, he became superintendent of Seaside Sanitarium Niantic where he remained until May, 1920.

In this period, Dr O'Brien married Hilda Louise Stickney of Hartford whose father was for many years in charge of Trinity College Commons. Dr and Mrs O'Brien moved to Hartford, and from 1920 until 1934 he maintained a general practice here and served on the staff at St Francis Hospital.

Dr O'Brien entered the Health Department August 24 1934 when he was appointed assistant superintendent and epidemiologist. When Superintendent C P Botsford retired in October 1935, Dr O'Brien became acting superintendent a post he held until April this year. Dr R V Boyce, then Health Board president became acting superintendent and Dr O'Brien was given an indefinite leave of absence because of ill health.

Dr O'Brien was a member of Rau Locke Post American Legion Hartford Council and Bishop Mc Mahon Assembly Knights of Columbus Bridgeport Lodge of Elks and the American Public Health Association.

He leaves his widow his mother (Julia A O'Brien Canny) of Bridgeport two daughters, Mary Elizabeth and Hilda Frances O'Brien, two brothers, Joseph O'Brien and William Canny, of Bridgeport two sisters, Mrs R W Keeley of Windsor, Ont., Canada and Mrs Raymond Maurer, of Point Barrow Alaska and several nieces and nephews.

#### HARTFORD HOSPITAL

At a dinner given recently in his honor as the newly appointed director of the Hartford Hospital by the managing directors and staff members Dr Wilmar V Allen presented the three main problems that he considered the Hartford Hospital faces in the immediate future. First how to provide medical care to all persons at a price that they can afford to pay secondly how to prevent the abuse of charity toward the medical profession and the hospital, and thirdly how the Hartford Hospital can carry out these aims. In offering a solution for the first problem Dr Allen suggested that it may be necessary to provide medical care on an insurance basis.

The Annual Meeting of the Hartford Hospital was held on November 12 1936. Mr Louis R. Cheney was again named president of the hospital. The staff elected included a few changes and additions consulting pathologist and bacteriologist Dr

resonant. No definite rales Expiration longer than inspiration Abdomen silent. Tympany generalized No dullness areas No peristalsis seen Upper abdomen rigid on both sides Lower abdomen soft Rectal large non tender prostate Extremities not remarkable

T 101° P 130 R 24

Note by Dr Cutts of the Cardiac Clinic P E and EKG do not bear out diagnosis of cardiac trouble  
W C 20 000—88 per cent P M N

X-ray examination of chest showed a large pneumothorax on the left and displacement of the heart and mediastinum to right, obscuring the right lung field but, so far as can be made out the right chest appears normal Plain films of the abdomen show no abnormality Morph. gr 1/6 given at 2 10 a m Saline and glucose intravenously ordered in forenoon and patient died while it was being given at 10 57 a. m.

At first we thought this a case of coronary sclerosis By the time we had apparently eliminated this and established the fact of a left pneumothorax the patient was in extremis

Pertinent extracts from autopsy report restricted to chest

The left lung is entirely collapsed and compressed against the mediastinum In the pleural cavity of that side there are 1500 cc of dark greivish rather foul smelling fluid There are a few fibrous adhesions at the apex of the left lung and these are made taut by the collapsed lung At the medial surface of the inferior portion of the lower left lobe the pleura (both the parietal and the visceral) is soft dark gray in color and it has a soft semi gelatinous consistency Elsewhere the pleura' surfaces are glistening and pink The right pleural cavity contains approximately 300 cc of dark gray fluid and there are slight fibrous adhesions at the apex but otherwise the pleural surfaces are pink and glistening The right lung is collapsed as the thorax is open but it is not compressed as is the left lung

The mediastinum with its contents is displaced to the right from 3 to 4 cm

The lining of the esophagus is grayish pink glistening and longitudinally folded At the junction of the esophagus and cardiac end of the stomach the wall of the esophagus is somewhat thickened over an area approximately 8 mm in width Posterior to the esophagus and involving the loose connective tissue between the esophagus and aorta is a rather broad tract where the tissue is dark gray and of semi gelatinous consistency This tract extends from the region of the junction of the esophagus and the diaphragm posteriorly upward and slightly to the left to the region of the inferior portion of the hilus of the left lung It is continuous with similar tissue which was described on the medial surface of the left lower lobe The esophagus was cut flush with the diaphragm and the stomach was removed through an opening made through the diaphragm In the posterior wall of the stomach in the region of the

esophageal orifice is an ulcer, the upper end of which was cut across when the esophagus was removed. This ulcer is fusiform in outline the long axis being parallel to the long axis of the esophagus It is 1.2 cm in length and 5 cm in the transverse diameter and the edges are smooth and rounded The base of the ulcer is approximately 3 mm below the surface of the edges There is a longitudinal fissure in the base which extends through the muscularis and into the surrounding connective tissue The deepest portions are approximately 1 cm below the surface and there the tissue is soft and dark gray in color When the esophagus and the stomach are reconstructed this fissure in the base of the ulcer is seen to communicate with the esophagus The pyloric orifice admits a finger with difficulty Around the serosal surface there is evidence of constriction and there is increase of tough gray fibrous tissue. On the mucosal surface of the pylorus there are two ulcers one approximately 8 mm in diameter the other approximately 8 mm by 2 cm. There is a narrow partition between these ulcers and they practically surround the pyloric orifice They are approximately 4 to 5 mm in depth Sections through the ulcers reveal increase in tough gray fibrous like tissue The stomach contains a considerable amount of dark grayish brown fluid of similar appearance and odor to that found in the left pleural cavity

Weiss and Mallory have described a clinical syndrome with vomiting followed by fissures or ulceration in the mucosa about the cardia and along the lower esophagus resulting in severe hemorrhages or perforation into the thoracic cavity Evidently this occurs more frequently than has been previously recognized The above case has been reported as it is thought that stressing this matter will put clinicians upon their guard and presumably early intervention may be of value in some of these cases.

PETER PRYDE CHASE M.D.

122 Waterman St  
Providence R I

## RECENT DEATH

TILDEN—FRANK ELMER TILDEN M.D. a retired physician of North Easton died at his home December 21 1936 aged 83 years

After graduating from the Harvard Medical School in 1876 he settled in North Easton where he was born and practiced there for 55 years He was a Fellow of the Massachusetts Medical Society from 1876 to 1915 Dr Tilden is survived by his widow Mrs Ellen Leonard Tilden

## NOTICES

### MEDICAL CONFERENCE PROGRAM

Boston Dispensary 25 Bennet Street Boston—  
Lecture Hall second floor 9 10 a m January 1937  
Tuesday January 5—The Diagnosis and Treatment  
of Certain Foot Conditions—Dr John D Adams

ISOLATION UNIT FOR THE BURBANK  
HOSPITAL FITCHBURG

An isolation building for the treatment of cases of diphtheria and scarlet fever has been built and equipped as an adjunct to the Burbank Hospital in Fitchburg. The plans were developed by James Purdon of Boston from ideas suggested by Dr E R Lewis, former superintendent, with the assistance of Dr Henry M Pollock, superintendent of the Massachusetts Memorial Hospitals in Boston.

Every device for the treatment of cases of communicable diseases and the prevention of cross infections has been installed. The construction has been designed to avoid the likelihood of the retention of germs.

Fitchburg is to be congratulated in having an up-to-date plant for dealing with communicable diseases.

## AN HONOR CONFERRED ON DR L M S MINER

The Alpha Omega dental fraternity has instituted the custom of an annual recognition of outstanding service to dentistry, and at a dinner at the Hotel Statler, Dr Leroy Matthew Simpson Miner was presented with the first Achievement Award Medal by this organization.

Dr Miner is the President of the American Dental Association and a Fellow of the Massachusetts Medical Society and the American Medical Association.

Dr William Rich of New York, Chairman of the Award Committee, delivered the presentation address. Dr Howard Marjerson, Dean of Tufts College Dental School, also spoke.

DR. SAMUEL H. EPSTEIN ADDRESSES THE  
SECTION OF PSYCHIATRY OF THE ROYAL  
SOCIETY OF MEDICINE

At a meeting of the Section of Psychiatry of the Royal Society of Medicine held in London on December 8, 1936, Dr Samuel H Epstein of Boston took part in the discussion of "The Follow up Study of General Paralysis." The opening papers were read by Dr F L Golla of The Maudsley Hospital and Dr J E Nicole of Lancashire. Dr Epstein is spending a year abroad on a grant from the Rockefeller Foundation.

## CORRESPONDENCE

## HORMONES AND HUMAN BEHAVIOR

December 17 1936

Editor, *New England Journal of Medicine*

I was very much interested in the editorial on "Hormones and Human Behavior" published in your issue of December 10 1936. The language used by Drs Collip and Hoskins on the presentation of the information corresponds very closely to the language used by the Hippocratic writers and by the late Dr Galen on the proper crasis or mixture in the body of the four fluids: yellow bile, black bile, blood and phlegm. Of course these fluids are not hormones

but the ancient orders purely recognized that the condition of health was dependent upon the proper proportion and circulation of the fluids of the human body. Certainly history does repeat itself.

Yours very truly,

F B LUND, MD

319 Longwood Avenue,  
Boston, MassPERFORATION OF AN ULCER NEAR THE  
JUNCTION OF THE ESOPHAGUS AND STOMACH

December 1, 1936

Editor *New England Journal of Medicine*,

In the Cabot Case Records of the Massachusetts General Hospital, published in the *Journal* of May 2, 1935, there is a report of a case of perforation at the cardio-esophageal junction with continuing perforation through into the left pleural cavity. At about the same time we saw the case reported below and thought it unique. But without any thorough search of the literature we found a somewhat similar case in *Med Klin* (Aug 12) 1932. In the *Brit M J* (May 11) 1935 appeared the report of a case of perforation of the esophagus near the cardia and into the left pleural cavity.

F P, 75 year old male, was admitted during the night to the Rhode Island Hospital.

C C Pain in the upper abdomen and left shoulder and arm for 3 hours. Admission note: Onset was sudden and of similar type but more severe than several other attacks of indigestion. He is constipated by nature and has not had a good bowel movement for a week but had a small movement yesterday. He was seen by Dr Farrell at 11 00 p m, with symptoms which have not increased in severity. B P 140/90. Temperature normal. Weak, barely audible heart sounds. The patient is conscious, rational and cooperative and gives a fairly adequate history. There is moderate dyspnea on exertion. Nocturia 5 to 6 times.

P H He has been a high strung nervous person all his life but never required any medical attention until 3 years ago when he fell to the floor and had numbness and weakness of his left arm that returned to normal function in 2 or 3 weeks. There is no history of serious illnesses or operations. For the past 3 months or so the patient has had loss of appetite and has lost 15 pounds of weight in the past 6 months.

P I On the day of admission he vomited 4 times, once directly after a meal. In the evening he had pain in abdomen, shoulder and arm as noted above. Knows of no coffee-grounds, vomitus, hematemesis, melena or blood streaked stools.

P E Markedly emaciated old man in evident pain with respiratory rate of 30/35 and definite difficulty in expiring using all accessory muscles of respiration. Slight cyanosis of nails. Fairly quiet. Head not remarkable. Forceful venous pulsations in neck. Heart limits very difficult to demarkate. Sounds scarcely audible and rapid evaluation difficult. Lungs



## ANNOUNCEMENT

FRANK J SULLIVAN, M.D., announces the opening of an office at 158 Mount Auburn Street Cambridge Mass

## REMOVALS

MAURICE G EVANS, M.D., announces the removal of his office to 416 Marlborough Street Boston, Mass

NATHANIEL R. MASON, M.D. announces the removal of his office to 270 Commonwealth Avenue Boston.

## NOTICES OF MEETINGS

### ESSEX NORTH DISTRICT MEDICAL SOCIETY

The 96th Semi Annual Meeting of the Essex North District Medical Society will be held Wednesday, January 6 at the First Universalist Church in Haverhill

Dinner will be served at 12 30 p m followed by the business meeting For the scientific program Dr Alexander P Althen will speak on the Significance of Epiphyseal Injuries' and Dr John Sproull will give A Review of Some Features of Regional Nefitis

### BOSTON ORTHOPAEDIC CLUB

A meeting will be held in Ware Hall Boston Medical Library, Monday, January 4 at 8 00 p m

1. Experiences in China Orthopaedic and other wise—Dr Phillips L. Greene
- 2 Discussion and Further Observations—Dr Van Gorder

Dr Greene is Dean of the Hunan Yale Medical College (Yale-in-China) and will speak not only on orthopaedic conditions but also on subjects of general interest His talk will be supplemented by Dr Van Gorder for many years Chief of the Orthopaedic Service at Peking Union Medical College

An interesting and entertaining evening is assured and wives and friends of members and guests are especially invited to attend

The general medical profession is also invited.

SUMNER M ROBERTS M.D. Secretary

### WACHUSETT MEDICAL IMPROVEMENT SOCIETY

MEETING—WEDNESDAY JANUARY 6 1937  
Bancroft Hotel Worcester

- 6 30 p m Dinner
- 7 15 p m Business Meeting
- 7 30 p m Scientific Program

Dr Frank H Lahey head of Lahey Clinic Boston Mass

Subject 'Hyperthyroidism — Hyperparathyroidism

Physicians cordially invited to attend

F WASHBURN, M.D., President,

N S SCARCELLO, M.D., Secretary Treasurer

### THE FAULKNER HOSPITAL CLINICAL MEETING

The next meeting will be held on January 7 at 5 p m. In addition to the usual clinical pathologic conference Dr William A. Rogers will speak on Fractures of the Vertebral Column  
All physicians are invited.

### NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held at the Peter Bent Brigham Hospital, Monday January 11, 1937 at 8 15 p m

#### PROGRAM

- 1 Three Clinical Case Records and Pathological Findings—Dr Samuel A Levine
- 2 Electrocardiographic Studies of Lead IV using Nine Chest Positions—Dr A. W Contratto
- 3 Electrocardiographic Studies of Autopsied Cases of Congenital Heart Disease—Dr Maurice Schnitzer
- 4 Studies on Venous Pressure—Dr C Sidney Burwell
- 5 The Circulatory Adjustments in Arteriovenous Fistula.—Dr J A Kennedy

All members of the New England Heart Association and interested physicians are invited to attend.

JAMES M FAULKNER, M.D., Secretary

### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY JANUARY 4 1936

##### Monday January 4—

- \*4 p m Physicians and medical students are cordially invited to attend a clinic presented by the Medical Surgical and Orthopedic Services of the Infants and Children's Hospitals in the Amphitheater of the Children's Hospital
- \*8 p m Boston Orthopaedic Club Boston Medical Library 3 Fenway

##### Tuesday January 5—

- \*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston The Diagnosis and Treatment of Certain Foot Conditions Dr John D Adams
- 3 30 a m Massachusetts General Hospital. Thoracic Clinic—Ether Dome

##### Wednesday January 6—

- \*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Hospital Case Presentation Dr S J Thannhauser
- 112 m Clinical-Pathologic Conference Children's Hospital Amphitheater
- 2 p m Massachusetts General Hospital Psychiatric Clinic Outpatient Department
- 4 p m - 5 p m Surgical Pathologic Conference Dr Cutler and Dr Wolbach Peter Bent Brigham Hospital

Wednesday, January 6—Hospital Case Presentation —  
Dr S J Thannhauser

Thursday, January 7—Functional Nervous Disorders  
—Dr A Warren Stearns

Friday, January 8—Studies Pertaining to Joint Effusions—Dr Walter Bauer

Saturday, January 9—Hospital Case Presentation —  
Dr S J Thannhauser

Tuesday, January 12—Gastro Intestinal Clinic—Dr  
K S Andrews

Wednesday, January 13—Hospital Case Presentation  
—Dr S J Thannhauser

Thursday, January 14—Urography and the Diagnosis  
of Diseases of the Upper Urinary Tract.—Dr H  
A Chamberlin.

Friday January 15—Carcinoma of the Colon and  
Rectum—Dr Frank H Lahey

Saturday, January 16—Hospital Case Presentation —  
Dr S J Thannhauser

Tuesday, January 19—Treatment of Ambulatory  
Cases of Diabetes with Protamine Insulin—Dr  
Joseph Rosenthal

Wednesday January 20—Hospital Case Presentation  
—Dr S J Thannhauser

Thursday, January 21—Transverse Rupture of the  
Aorta—Dr W R Crowe

Friday, January 22—General Considerations of Cor  
onary Thrombosis—Dr Cadis Phipps

Saturday January 23—Hospital Case Presentation —  
Dr S J Thannhauser

Tuesday, January 26—X ray Demonstration—Dr  
Alice Ettinger

Wednesday, January 27—Hospital Case Presentation  
—Dr S J Thannhauser

Thursday, January 28—Social Service Case Presen  
tation—Miss E R Canterbury

Friday, January 29—Recent Advances in the Surgery  
of the Chest.—Dr Edward D Churchill

Saturday, January 30—Hospital Case Presentation  
—Dr S J Thannhauser

#### MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 p m on Thursday, January 7 in the Amphitheater of the Peter Bent Brigham Hospital Dr Henry A. Christian, Hersey Professor of the Theory and Practice of Physic Harvard Medical School and Physician in Chief, Peter Bent Brigham Hospital, will give a medical clinic To it are cordially invited practitioners and medical students

#### BOSTON'S COMMUNITY FUND CAMPAIGN

Boston physicians, as usual, are interested in the efforts of Greater Boston's Community Fund campaign in behalf of the 104 hospitals health and social agencies which will benefit in 1937

Dr Francis M Rackemann is chairman of the physicians group for the coming campaign and the vice-chairmen are as follows Dr Theodore L Badger Dr Miles P Baker Dr Edwin B Dunphy, Dr Thomas R Goethals Dr Trygve Gundersen Dr

E Parker Hayden, Dr Clark W Heath, Dr Richard B King, Dr James P O'Hare, and Dr Samuel V Vose

Robert Cutler, general chairman of the campaign, reports that 15,000 volunteers will help in collecting money and pledges in Boston proper and in the forty-two cities and towns of Metropolitan Boston which are served by the participating hospitals and agencies

The 1937 campaign, says Mr Cutler is going to better last year's record, fine as it was Last year more than 120,000 individuals pledged a total of three and three-quarters millions to the support of the agencies in the Community Federation of Boston This year we are working for a greatly increased number of givers and an increased rate of giving

'For a period of seven years now, many of our agencies have operated under deficits which have eaten into their capital funds or have been forced to curtail needed services The successful oversubscription of last year's goal of \$3 750,000 was the first step in establishing on a permanent basis support for the needs of these agencies The success, however, of the 1936 campaign has actually meant the payment in 1936 of only 77 per cent on the average, of these agencies' minimum operating requirements as established through the careful analysis of their submitted budgets by a representative citizens' Budget Committee This year it is essential to over subscribe a larger quota and thus to fill in this gap between the 77 per cent and the 100 per cent of minimum needs

'We hope to enroll twice as many volunteer workers this year as in 1936 With an army of 15,000 volunteers of whom more than 2 000 are already at work, we shall be able to rouse the whole community to the service of the agencies and to their needs The results of campaigns in other cities point to a larger and finer support for the private charitable agencies in 1937 than ever before'

No class of prospective givers should be more interested in the success of this campaign than the doctors Those with appointments on the staffs of hospitals financed in part by the campaign are absolutely dependent on its success for the continuance of the breadth of work and investigation now carried out in their hospitals Those without such appointments depend on the same hospitals to care for their patients when financial or medical reasons make it impossible for the patient to get the best care as private patients Doctors have always been generous of their time to the poor If not for other reasons, purely to set an example as those receiving great indirect benefit, they must also give generously in money If the doctors quota should be set at double that of last year it could be reached without any man giving so generously as the employees of many large corporations do

The organization is being formed now The actual solicitation will take place at the end of January Let every doctor do his part to show the community how we appreciate their work for us



## Thursday, January 7—

- \*8 30 - 9 30 a m Exchange visit Surgical and Orthopedic Staffs of the Peter Bent Brigham and the Children's Hospitals held this week at the Peter Bent Brigham Hospital
- 9 a m Massachusetts General Hospital Surgical Grand Rounds
- \*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Functional Nervous Disorders Dr A Warren Stearns
- 9 15 a m Massachusetts General Hospital Neurological Conference Ether Dome
- 12 m Massachusetts General Hospital Clinical-Pathologic Conference
- \*3 30 p m Medical Clinic at the Peter Bent Brigham Hospital Dr Henry A. Christian
- 5 p m Faulkner Hospital Clinical Meeting
- \*6 30 p m Joint Meeting of the Boston Council of Social Agencies and the Boston Health League at the Hotel Vendome Boston

## Friday, January 8—

- \*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Studies Pertaining to Joint Effusions Dr Walter Bauer
- 10 a m Massachusetts General Hospital Fracture Rounds
- 12 m Massachusetts General Hospital Clinical Meeting of the Staff of the Children's Medical Service Ether Dome

## Saturday, January 9—

- \*9 a m - 10 a m Boston Dispensary 25 Bennet Street Boston Hospital Case Presentation Dr S J Trannhauser
- \*10 a m - 12 m Staff Rounds at the Peter Bent Brigham Hospital Conducted by Dr Henry A. Christian

## Sunday, January 10—

- 4 p m Free public lecture at the Harvard Medical School Building D Longwood Avenue Boston "Air-Conditioning and Health" by Professor Phil Ip Drinker

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

- January 4—Boston Orthopaedic Club See page 1321
- January 5 30—Boston Dispensary Medical Conference Program See page 1319
- January 6—Wachusett Medical Improvement Society See page 1321
- January 7—Faulkner Hospital Clinical Meeting See page 1321
- January 7—Medical Clinic at the Peter Bent Brigham Hospital See page 1320
- January 7—Joint Meeting of the Boston Council of Social Agencies and the Boston Health League See page 1259 issue of December 24
- January 10 March 21—Sunday Afternoon Lectures at the Harvard Medical School See page 1141 issue of December 10
- January 11—New England Heart Association See page 1321
- January 14—Pentucket Association of Physicians Hotel Bartlett 95 Main Street Haverhill, at 8 30 p m
- January 15—William Harvey Society 8 p m in the Auditorium of the Beth Israel Hospital Boston
- January 15—Boston Society for the Advancement of Gastroenterology See page 1145 issue of December 10
- January 20—Illustrated Lecture at the Robert B Brigham Hospital See page 1256 issue of December 24
- February 3—American Social Hygiene Association See page 1186 issue of December 17
- February 25, 26, 27—The New England Hospital Association Hotel Statler Boston
- March 30 - April 2—First International Conference on Fever Therapy Postponement notice See page 52 issue of July 2
- April 21 24—American Society for Experimental Pathology See page 1075 issue of May 21
- October 25 29—American College of Surgeons Chicago Illinois

## DISTRICT MEDICAL SOCIETIES

## ESSEX NORTH DISTRICT MEDICAL SOCIETY

January 6—See page 1321

## ESSEX SOUTH DISTRICT MEDICAL SOCIETY

January 6—Meeting at the Danvers State Hospital, Hathorne 5 p m

## FRANKLIN DISTRICT MEDICAL SOCIETY

Will meet at the Weldon in Greenfield at 11 a. m the second Tuesdays of January, March and May

Sunderland CHARLES MOLINE, M D Secretary

## MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

January 13—Bear Hill Golf Club Stoneham

March 16—Danvers State Hospital Danvers

May 11—Bear Hill Golf Club, Stoneham

KENNETH L. MACLACHLAN M D, Secretary  
1 Bellevue Avenue, Melrose

## NORFOLK DISTRICT MEDICAL SOCIETY

January 19—8 15 p m The Peter Bent Brigham Hospital Communications and Case Presentations by the Staff Suggested title—Abdominal Pain from the Medical and Surgical Standpoint Details of program to be announced

February 23—Time place and details of program to be announced

March 30—8 15 p m New England Deaconess Hospital A Symposium on Diabetes entitled A Survey of the Diabetic Work of the George F Baker Clinic in the New England Deaconess Hospital Communications and Case Presentations by the Staff Drs Elliott P Joslin, Howard F Root, Priscilla White, Alexander Marble and Allen P Joslin

May—Annual Meeting Details to be announced.

Note The Censors will meet for the examination of candidates on the first Thursday of May 1937 Fee of \$10 00 is payable at the time of examination Application blanks may be obtained by writing the Secretary furnishing name, address and name of school of graduation in medicine Application must be made at least three weeks prior to date of examination Candidates whose applications are on file will receive proper notices

FRANK S CRUICKSHANK, M D Secretary  
1247 Beacon Street Brookline

## PLYMOUTH DISTRICT MEDICAL SOCIETY

January 21—11 a m Bridgewater State Farm

March 18—11 a m Brockton Hospital

April 16—Annual Meeting 11 a m Ducey Hospital.

May 20—11 a m Lakeville State Sanatorium

FRED F WEINER M D Secretary  
231 Main Street, Brockton

## SUFFOLK DISTRICT MEDICAL SOCIETY

January 27—Boston Medical Library 8 15 p m Joint Meeting with the Boston Medical Library Anthropology Dr Carleton S Coon

March 31—Boston Medical Library 8 15 p m Social Insurance—It Affects the Medical Profession Dr Charles E Morgan Discussion Dr Channing Frothingham

April 28—Annual Meeting Boston Medical Library 8 15 p m Problems in Surgical Diagnosis Dr Howard M Clute

CONRAD WESSELHOEFT M D President  
CHARLES C LUND, M D, Secretary

## WORCESTER DISTRICT MEDICAL SOCIETY

January 13—Worcester City Hospital Worcester Mass 6 15 p m Dinner—complimentary by the hospital. 7 30 p m Business session and scientific program

February 10—Worcester State Hospital, Worcester Mass 6 15 p m Dinner—complimentary by the hospital 7 30 p m Business session and scientific program

March 10—The Memorial Hospital Worcester Mass 6 15 p m Dinner—complimentary by the hospital. 7 30 p m Business session and scientific program

April 14—Worcester Hahnemann Hospital Worcester, Mass 6 15 p m Dinner—complimentary by the hospital. 7 30 p m Business session and scientific program

May 6—At 4 30 in the rooms of the Worcester Medical Library Inc at 34 Elm Street Worcester will be held the spring meeting of the Board of Censors

Wednesday Afternoon and Evening, May 12—Annual Meeting Time and place for this meeting will be announced in an early spring issue of the Journal

ERWIN C MILLER, M D Secretary  
27 Elm Street, Worcester

## WORCESTER NORTH DISTRICT MEDICAL SOCIETY

January 27—Meeting at the Leominster Hospital 4 3

